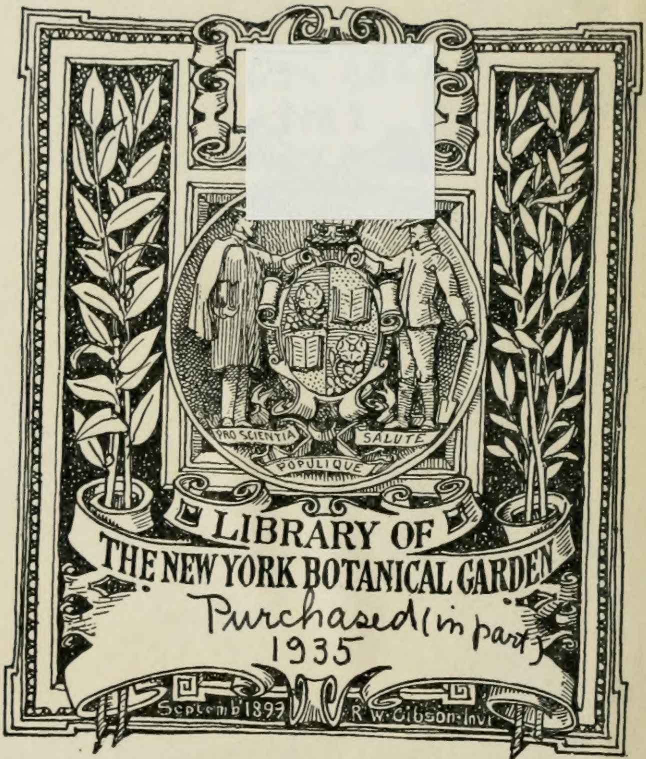

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NORTHERN
NUT GROWERS ASSOCIATION

REPORT
OF THE PROCEEDINGS AT THE
SEVENTH ANNUAL MEETING

WASHINGTON, D. C.
SEPTEMBER 8 AND 9, 1916.

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JAN 2 1934

OFFICERS OF THE ASSOCIATION

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Vice-President	W. N. Hutt	Raleigh, North Carolina
Secretary and Treasurer	W. C. Deming	Georgetown, Connecticut

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Executive—T. P. Littlepage, J. Russell Smith and the Officers

Finance—T. P. Littlepage, Willard G. Bixby, W. C. Deming

Hybrids—R. T. Morris, C. P. Close, W. C. Deming, J. G. Rush

Membership—Harry R. Weber, R. T. Olcott, F. N. Fagan, W. O. Potter, W. C. Deming, Wendell P. Williams, J. Russell Smith

Nomenclature—C. A. Reed, R. T. Morris, R. L. McCoy, J. F. Jones

Press and Publication—Ralph T. Olcott, J. Russell Smith, W. C. Deming

Programme—W. C. Deming, J. Russell Smith, C. A. Reed, W. N. Hutt, R. T. Morris

Promising Seedlings—C. A. Reed, J. F. Jones, Paul White

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California	T. C. Tucker	311 California St., San Francisco
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Washington	A. E. Baldwin	Kettle Falls
West Virginia	B. F. Hartzell	Shepherdstown

MEMBERS OF THE NORTHERN NUT GROWERS ASSOCIATION

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Goddard, R. H., States' Relations Service, Washington
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---

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Williams, Wendell P., Danville

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Pannell, W. B., Pittsford

---

* Life member.

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Simmons, A. L., State Highway Department, Albany
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*Wissman, Mrs. F. de R., Westchester, New York City

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Hutt, Prof. W. N., State Horticulturist, Raleigh
Van Lindley, J., J. Van Lindley Nursery Company, Pomona
Whitfield, Dr. Wm. Cobb, Grifton

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Rife, Jacob A., Camp Hill

* Life member.

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*Sober, Col. C. K., Lewisburg
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Smith, Dr. J. Russell, Roundhill

Washington

Baldwin, Dr. A. E., Kettle Falls
Rogers, Dr. Albert, Okanogan

West Virginia

Hartzell, B. F., Shepherdstown

* Life member.

CONSTITUTION

ARTICLE I

Name. This society shall be known as the NORTHERN NUT GROWERS ASSOCIATION.

ARTICLE II

Object. Its object shall be the promotion of interest in nut-bearing plants, their products and their culture.

ARTICLE III

Membership. Membership in the society shall be open to all persons who desire to further nut culture, without reference to place of residence or nationality, subject to the rules and regulations of the committee on membership.

ARTICLE IV

Officers. There shall be a president, a vice-president and a secretary-treasurer, who shall be elected by ballot at the annual meeting; and an executive committee of five persons, of which the president, two last retiring presidents, vice-president and secretary-treasurer shall be members. There shall be a state vice-president from each state, dependency or country represented in the membership of the association, who shall be appointed by the president.

ARTICLE V

Election of Officers. A committee of five members shall be elected at the annual meeting for the purpose of nominating officers for the following year.

ARTICLE VI

Meetings. The place and time of the annual meeting shall be selected by the membership in session or, in the event of no selection being made at this time, the executive committee shall choose the place and time for the holding of the annual convention. Such other meetings as may seem desirable may be called by the president and executive committee.

Article VII

Quorum. Ten members of the association shall constitute a quorum, but must include a majority of the executive committee or two of the three elected officers.

Article VIII

Amendments. This constitution may be amended by a two-thirds vote of the members present at any annual meeting, notice of such amendment having been read at the previous annual meeting, or a copy of the proposed amendment having been mailed by any member to each member thirty days before the date of the annual meeting.

BY-LAWS

Article I

Committees. The association shall appoint standing committees as follows: On membership, on finance, on programme, on press and publication, on nomenclature, on promising seedlings, on hybrids, and an auditing committee. The committee on membership may make recommendations to the association as to the discipline or expulsion of any member.

Article II

Fees. The fees shall be of two kinds, annual and life. The former shall be two dollars, the latter twenty dollars.

Article III

Membership. All annual memberships shall begin with the first day of the calendar quarter following the date of joining the association.

Article IV

Amendments. By-laws may be amended by a two-thirds vote of members present at any annual meeting.

Northern Nut Growers Association

SEVENTH ANNUAL MEETING

September 8 and 9, 1916

Washington, D. C.

The seventh annual meeting of the Northern Nut Growers Association was called to order in rooms 42-43 of the new building of the National Museum at Washington, D. C., on Friday, September 8th, at 10 a. m., the president, Dr. J. Russell Smith, presiding.

The President: It is often customary to start meetings of this sort with a considerable amount of eloquence, such as an address of welcome by some high city or state official, a response to the address of welcome by some one else high in authority, and so on, during which the visitors are told of the many privileges they may enjoy, "the keys of the town" are handed over to them, and a good deal of high-flown oratory is indulged in. We suppose that the people in attendance at this meeting are so well acquainted with Washington that those preliminaries are unnecessary, and I have been informed by the members of the local committee that we can dispense with the frills in this case and proceed with the business of the meeting, which we think is going to rather crowd our time if we get said all that we want to say. We are going to devote this morning's programme first to a paper by Dr. Robert T. Morris on the chinquapin, and then to the discussion of a comparatively newly considered member of our nut family, namely, the American black walnut. We have been heretofore much interested in sundry exotics and talking far too little about this great tree nearer home.

Before taking up the technical programme we have a few matters of business to put through. First, we will have the report of the secretary and treasurer.

REPORT OF THE SECRETARY-TREASURER

Balance on hand date of last report	$ 140.24	
Receipts:		
Dues	292.75	
Advertisements	21.00	
Contributions	5.50	
Sale of report	34.75	
Contributions for prizes	10.00	
Miscellaneous	.65	
		$504.89
Expenses:		
Printing report	$ 142.56	
Envelopes for report	9.00	
Miscellaneous printing	32.50	
Postage and stationery	49.26	
Stenographer	26.35	
Express and freight	2.77	
Prizes	18.00	
Checks, J. R. S. expenses and circulars	180.00	
Lantern operator	3.00	
Litchfield Savings Society	20.00	
		$483.44
Balance on hand		$21.45

Receipts from all sources, except sale of reports, have fallen off markedly, as have new members, 31 less than last year, though we have now 154 paid up members, one more than last year. 10 members have resigned and 42 have been dropped for non-payment of dues. We have lost one member by death, Herbert R. Orr, of Washington.

The committees on membership and on finance should be more active.

Our annual report constitutes the minutes of the last meeting. Our nut contest and other matters of interest have been reported through the columns of the American Nut Journal, our official organ.

[Accepted.]

THE PRESIDENT.: Next in order of business is the first step toward the election of officers for the ensuing year. It is our custom to have a nominating committee elected at an early session. They deliberate and bring forward a slate which is voted on at a later session. This morning is a suitable time for the election of a committee, and tomorrow morning will be a suitable time for their report. Are there any nominations for the Nominating Committee?

Mr. M. P. Reed: Mr. President, I move that Dr. Morris, Mr. C. P. Close, Mr. C. A. Reed, Prof. Stabler and Dr. Ira Ulman be appointed as the Nominating Committee.

The President: Are there any other nominations?

Mr. C. A. Reed: Mr. President, I would like to ask that Mr. Littlepage's name replace my name on that committee.

The President: Will the nominating member accept that amendment?

Mr. M. P. Reed: Yes, sir.

The President: Are there any other nominations? Do I hear a second to the nominations?

A Member: Second it.

[Carried.]

The President: Are there any other committees to report at this time?

The Secretary: There is a Committee on Incorporation.

Mr. T. P. Littlepage: Mr. President, the Committee on Incorporation has done some investigating as to the desirability of incorporating the Association, and also, if desirable, under what laws, but that committee has not yet made any final report nor come to any final conclusion, and I would suggest, as a member of the committee, that the committee be continued and instructed to report the following year.

The President: I think that it is unnecessary to vote on the continuance of the committee, as it was appointed with indefinite tenure. We will proceed with the programme and first have the pleasure of listening to Dr. Morris.

NOTES ON THE CHINQUAPINS.

Dr. Robert T. Morris, New York

According to Sargent the chinquapin (*Castanea pumila*) occupies dry sandy ridges, rich hillsides and the borders of swamps from southern Pennsylvania to northern Florida and the valley of the Neches River in Texas. He states that this chestnut is usually shrubby in the region east of the Alleghany Mountains, and assuming the tree form west of the Mississippi River. Most abundant and of largest size in southern Arkansas and eastern Texas.

Curiously enough there are chinquapins also in northeastern Asia which occur as understudies of the larger chestnuts, very much as they do in America.

The indigenous range of the chinquapin in America is limited northward by a plan of nature for checking distribution of the species. This plan is manifested in a habit which the nuts have of sprouting immediately upon falling in the early autumn. They proceed busily to make a tap root which may become several inches in length before frost calls a halt. In the north where the warm season is not long enough to allow the autumn sprout to lignify sufficiently for bearing the rigors of winter it is killed. If we protect the small autumn plants, or if we transplant older seedlings from their natural habitat, they may be grown easily far north of their indigenous range. Thrifty chinquapins are happy in the Arnold Arboretum at Jamaica Plain in Massachusetts, and no one knows but they might be cultivated in Nova Scotia and Minnesota.

The American chinquapin is one of the many beautiful and valuable plants which have not as yet been taken up by horticulturists for extensive development. It promises to become one of our important sources of food supply for tomorrow. If we were to develop all of our plant resources at once it would be an unkindness to the horticulturists of two thousand years from now, who would be left moping around with nothing to do. Chinquapin nuts borne in heavy profusion by the plants are delicious in quality, but usually too small to attract customers aside from the wood folk. The wood of the chinquapin of tree form (*C. pumila var. arboriformis*) is valuable for purposes to which wood of the common American chestnut is put, and some of the tree chinquapins acquire an earned increment of two or three feet diameter of trunk, and a height of more than fifty feet. The bush chinquapin on the other hand feels rather exclusive when attaining a height of as much as fifteen feet.

I present for inspection a freshly cut branch from an ordinary bush chinquapin, loaded with burs, indicating the prolific nature of the variety. The nuts in this particular specimen are small. The next branch exhibited is from a similar bush, but with nuts quite as large as those of the average common chestnut. The horticulturist has only to graft or bud his ordinary run of chinquapin stocks from some one bush which bears large nuts, and he will then have a valuable graded market product. The larger the nut the less prolific the plant is a rule which holds good with the fruiting of almost any plant.

Look at this branch from a tree chinquapin. It is not remarkable in any way, but the leaves seem to be a little larger than those of the bush chinquapin. My tree chinquapins came from Stark's nursery in Missouri. The first two which came into bearing had nuts quite as large as those of the common chestnut and I imagined that a discovery of value had been made, but other trees of this variety later bore very small nuts, and all of the tree chinquapin nuts, large and small, were much duller in color than those of the bush chinquapin. My final conclusion is that so far as nuts alone are concerned we may plant and cultivate either the tree variety or the bush variety of the species and then bud or graft any number of stocks from some one plant which bears the best product.

DR. AUGUSTUS STABLER: Is it a somewhat finer grained wood than the ordinary chestnut?

DR. MORRIS: I think it is. All the chestnuts have rather coarse wood. It is strong, hard, durable, and valuable. This chinquapin wood is somewhat coarse grained, but, for comparison with the American chestnut, I don't know. I imagine it is finer grained.

DR. AUGUSTUS STABLER: I know that the chinquapin wood is very much tougher than the American chestnut.

DR. MORRIS: Oh, yes. You cannot break the branches so easily.

Here is a branch from a hybrid between a chinquapin and a common American chestnut (*Castanea dentata*). The leaves and bark, you will observe, are very much like those of the larger parent. The burs are borne singly or in small groups like those of the common chestnut, instead of being crowded in dense clusters like chinquapin burs. There are two or three nuts to the bur, while the chinquapin has normally, but one nut to the bur. This particular hybrid tree showed an interesting peculiarity. During the first two seasons of bearing it had but one nut to the bur, and this was of chinquapin character. In the third year its nuts were still borne singly, but they were lighter in color than before and oddly corrugated at the base. As the tree became older its chestnut parentage influence predominated, and the tree began to bear two or three nuts to the bur, and more like chestnuts in character, becoming smooth again at the base.

I have a number of hybrids between chinquapins and various species and varieties of other chestnuts, but none of these as yet has produced nuts of marked value. There seems to be a tendency for the coarseness of the larger nuts to prevail in the hybrids, a certain loss of gentility beneath a showy exterior.

The next branch which I present for inspection is from a most beautiful member of the chestnut family, the alder-leaved chestnut (*Castanea alnifolia*). It is classed among the chinquapins in Georgia where the plant is nearly if not quite evergreen. At Stamford it is deciduous very late in the autumn, but sometimes a green leaf will be found in February, where snow or dead leaves on the ground have furnished a protecting covering. The notable value of this species is perhaps in its decorative character for lawns, although the nuts are first rate. The dark green brilliant leaves are striking in appearance, and the shrub is inclined toward a trailing habit, much like that of some of the junipers. This species is one of my pets at Merribrooke, and a perennial source of wonder that nurserymen have not as yet pounced upon it for purposes of exaggeration and misstatement in their annual catalogues.

All of these specimens shown today are from my country place at Stamford, Connecticut, where the mercury in the thermometer leads one to make quotations relating to the Eve of Saint Agnes; five or ten degrees below the zero of Fahrenheit occasionally, and once down to twenty degrees below without injury to any kind of chestnut so far as I could observe.

I cannot make an exhibit of the golden-leaved chinquapin, from the Pacific slope, because tragedy came to all of my little trees of this species, and like most of the Pacific slope plants they are not very joyous in the east. One lot lived through one winter at Merribrooke, but they were the first green things that my cows saw in the springtime, and further comment would be surplus. A single specimen took courage in its root and grew finely until autumn, but it was near a path and somebody pulled it up and left it lying stark naked on the ground. Botanists have recently made two species of the golden-leaved chinquapin, one of the species attaining a height of more than one hundred feet. If horticulturists will secure specimens of *Castanopsis chrysophilla* from the region of Mount Shasta in California I presume that this beautiful evergreen chinquapin may be taught to grow in some of our gardens. It is cultivated in the gardens of temperate Europe. In our north it should be planted close to a running brook, where the roots of young trees can carry water in plenty to the evergreen top while the ground is frozen hard in winter.

Our common chinquapin of the east is perhaps the one that will be cultivated most profitably in the region between the Rocky Mountains and the Atlantic coast. The beauty of freshly picked bush chinquapin nuts is not rivalled by that of any other kind of nut that I have ever seen. The exquisitely polished mahogany color comes out of a light downy cloud near the apex of the nut, dark as midnight for a moment and then shading through glows of lively chestnut until it dawns in a dreamy cream color at the base, with just enough suggestion of green to temper the reds.

If any gourmet with a color soul could serve each one of his friends to a plate of twenty freshly picked bush chinquapins along with two Bennett persimmons, and all resting upon late September leaves of tupelo or of sweet gum the friends would remain and live at his expense while the combination lasted.

Furthermore, the children must always be taken into consideration along with chinquapin questions. According to authorities on the subject of decadence, we do not care very much about the children in these days. If some old-fashioned folks still remain, and if these old-fashioned folks do not take any particular personal interest in the beautiful garden and lawn trees that America has held out towards us in the chinquapins, they may at least plant a few of them because of the social standing that will follow. How so? Well, you see, it's because the parents of elite children will run over for a little visit in order to find out why the children do not come home. Then again, we are kind to dumb animals when raising chinquapins. Squirrels and white-footed mice, crows and blue jays are full of enthusiasm for the nuts, and they will assume the responsibility of gathering the crop if the matter is left in their charge.

This is really a funny country; something of a joke of a country when you come to think of it. Instead of setting out trees that will become both useful and beautiful, in accordance with the old Greek ideal of combining beauty and utility we set out Norway spruces that will make people hate evergreens in general. We set out poplars and all sorts of bunches of leaves in our parks and along the highways, instead of trees still more beautiful that would yield tons of coupon dollars every autumn. *De gustibus non est disputandum!*

When experimenting with hybridization of chinquapins, I ran across a phenomenon of new interest to botanists, and quite accidentally. A number of clusters of pistillate flowers of the bush chinquapin had been covered with paper bags, but not pollenized because of a shortage of pollen. An active man with a good sense of neatness and order would have removed those bags merely for the sake of appearance, but I was lazy and allowed the bags to remain for two or three weeks. When they were finally removed, it was found that the branches had set quite full of fruit, although not so full as other branches that had been pollenized from oaks. We were evidently dealing with an instance of parthenogenesis. The flowers that had received oak polen did not show any oak parentage later in their progeny, and it was observed in other experiments in other years that almost any cupuliferous pollen would start cells of the chinquapin ovary into division and into the development of fertile nuts, but without inclusion of the pollen cell in a gamete. For purposes of convenience in thinking I have temporarily called this phenomenon "stereochemic parthenogenesis." Apparently the propinquity of foreign pollen serves to stimulate a female cell into division, although the pollen cell retains fixed molecular identity, and does not fuse with the female cell. I need not bring up abstruse questions of chromatin or of subatomic influence here.

At Stamford the bush chinquapins begin to blossom regularly about the twelfth of June, irrespective of weather conditions. The tree chinquapins blossom a little later, but the alder-leaved chestnut may not blossom until July, later than the common American chestnut. The bush chinquapins begin to open their burs very regularly about the fifteenth of September; earlier than any other chestnuts. They bear at an early age, sometimes in their fifth summer.

Grafting and budding is easily done among all of the chestnuts as a rule, and this year I employed for the first time a large chinquapin bush for top-working with the choice Merribrooke variety of the common chestnut. Every one of the grafts caught, and some of them have grown tremendously. This introduces an interesting question. May we graft the common American chestnut upon bush chinquapin stocks and secure precocious bearing? In that case we shall have trees like the dwarf apple and pear trees that are readily pruned and sprayed.

The chinquapin is practically immune to the blight (*Endothia parasitica.*) Easily blighting varieties of choice American chestnuts may be grafted upon these blight resistant stocks in orchard form if my experiment proves to be a success. It will not lessen the vulnerability of the American chestnut, but dwarf trees will be within reach of the horticulturist's pruning knife and spray outfit. Orchards of fine varieties of the common chestnut may perhaps be maintained in this way until the present epidemic of Endothia has expended its protoplasmic energy, or until it has succumbed to microbic parasites of its own.

The President: Are there any questions to put to Dr. Morris?

The Secretary: I venture to say that a good many people have tried, in the north, to raise the chinquapin, and I would like to have Dr. Morris tell us what to do to get it to grow best, whether to buy the trees from the nurserymen, or to plant the nuts, and just how to do it.

Prof. C. P. Close: I would like to ask Dr. Morris about those chinquapins that set without the application of pollen, whether they fill well and whether they sprout at planting?

Mr. Littlepage: With us out in Maryland it isn't a question of producing the chinquapin; we cut the bushes down every year by the thousands; we have nothing at all against it, but we have found that the weevil has been absolutely unsurmountable with us. It is the only discouraging thing about it in this part of the country. Around Washington the chinquapin is a weed tree, and if you gather a peck of chinquapins you will find that the whole peck, in two weeks, have turned to weevils. Perhaps Dr. Morris can tell us what to do about that, and put us on the road to success.

The President: I should like to ask Dr. Morris two questions, first, as to the possibility of utilizing the western tree chinquapins as stocks for the larger eastern chinquapins with nuts of chestnut size. Is there a possibility thus of getting a larger tree?

The second question is akin to that — utilization of the western tree as a stock for a hybrid chinquapin which might have arboreal possibilities and enough chinquapin qualities to be blight-resistant.

Dr. Stabler: I am very much interested in Dr. Morris' proposition to produce dwarf chestnut trees by grafting on chinquapin stocks. Now, the difficulty I would expect to encounter is the same as when pecans are grafted on hickory, and when sweet cherries are grafted on Mahaleb, namely, that the root is not sufficiently vigorous to support the top. The fact that his grafts grew so tremendously when put on the chinquapin roots would look as though that might occur.

The President: The audience seems to have run out of questions.

Dr. Morris: All right, sir. First, how are we to grow chinquapins? Plant as soon as the nuts have fallen. Put them in a cage. I have wire cages that are about eight inches high, and about two feet wide and three feet long. I plant all the nuts there. They have wire mesh tops to keep out the rodents; that is the important thing. All nuts, I find, are best planted under conditions which stimulate the normal conditions. Our nut trees are not as yet domesticated. They haven't learned bad habits, and they depend upon peculiarly favorable conditions of moisture, warmth and light. You plant a nut two inches below the surface, but nature doesn't do anything like that. Consequently, that nut is surprised, doesn't know what to do, and stays down there looking for something to happen. But if you put that nut so it is about half buried in the sand, so that it is damp on one side and the sun strikes it on the other side, and the frost and snow affect it naturally, the nut does just what you want it to do. It gets out of that uncomfortable condition and begins to grow. (Laughter.) When planting any nuts, I place them in the sand and leave one side exposed to light, moisture, frost, and the observation of visitors. When I have sprouted chinquapins in the north and there is danger of their not lignifying when the ground begins to freeze, I put a lot of little sticks upright amongst them, so that my mulch will not bear too heavily upon the chinquapins, and then cover them with several inches of oak leaves, or any good, strong leaves that will not pack too tightly. That mulch of loose leaves will protect the sprouted nuts perfectly during the winter in Connecticut, so they all start growing in the next spring.

Another way is to buy chinquapin stocks from any of the nurserymen, stocks two or three years old, which begin to bear when four or five years of age.

Professor Close, I think it was, who asked if the nuts were fertile, both the ones that developed without fertilization by any pollen and the ones that developed by stereochemic parthenogenesis — by the influence of neighboring pollen. Both sorts are fertile, and I presume that the effect of that would be similar to the effect of close inbreeding. In other words, we would have intensification of characteristics of some one parent. If you get parthenogenesis through two or three generations I presume that same peculiar feature of the original parent would become so intensified as to become a marked feature of the progeny. This offers a new line of cleavage for horticultural investigation. I am very glad that you raised that question.

Answering Mr. Littlepage, I have apparently managed to get some crosses back and forth between chestnuts, and oaks, and beech, this year. I have a number of those crosses now under way that are apparently good hybrids.

DR. STABLER: A cross between a chestnut and a beech?

DR. MORRIS: Yes, I think so. You see, I have got to wait a year or so until the plants develop later characteristics. All of these parent trees are pretty closely related, you see. The blooming period between the different ones may be as much as two or three weeks, or three months apart, in fact. I have cross pollinated hazels and oaks, this year. The way to do that is to find correspondents at the extreme limit of the blossoming range of the species, who will send pollen. For instance, Professor Hume, in Florida, sends me chestnut pollen in time to cross my oaks, and Professor Conser, of the University of Maine, has some beeches that blossom in time for me to cross with chinquapins and oak trees. That is one way to do it.

Another way is to put your pollen in cold storage with some sphagnum moss, just put a little damp moss in your box with the pollen and put it in cold storage, and keep it at just about forty, above the freezing point. Another way is to put branches with dormant flower buds in cold storage. Hazels, for instance, may be kept for six months in this way. Put them in water, in the sun, and you soon have flowers furnishing pollen. I would take up the whole session of two days here if you were to ask too many questions along that line. (Laughter.)

Mr. Littlepage's question about the weevils. The question may be settled very easily where there are not many chinquapin trees. That is the case in Connecticut. Collect all the nuts, and you collect all of the weevil larvae. Curiously enough, the common chestnut weevil, that had become very abundant, has disappeared locally with the disappearance of our American chestnut, and has not attacked our chinquapins. If you have an orchard of chinquapins and collect all the nuts you will soon dispose of the weevils. That is the only way that I know of for disposing of the weevils. Eat them up. (Laughter.) You can pick out the weevil chestnuts fairly well if you toss all of the nuts into a cup of water and pick out the ones that float. Pound them up with a mallet and throw them into the chicken coop.

Dr. Smith asks if the use of the tree chinquapin as a stock for the American chestnut would give good-sized trees. Undoubtedly. and, besides that, if it is used for hybridizing purposes, we shall probably find that we have, now and then, an individual that is very much larger than the American chestnut or the tree chinquapin. It is a peculiarity of hybrids to show eccentricities, and many hybrids that occur are very thrifty and larger than either parent. That is the case with the Royal walnut that they have said so much about in California It grows so rapidly there that even Californians do not dare to tell about it. (Laughter.)

Another question, the last one — will the effect of using a bush chinquapin stock for the American chestnut be like that of growing sour cherries upon stocks which do not carry them well? Now, we have there what the lawyers call "a question of fact," and we shall have to work that out. Some tops will exhaust a root. Some tops will grab a root by the back of the neck and drag it right along. Some tops will adjust themselves philosophically to almost any sort of unusual conditions, and go on and bear fruit like true philosophers. We have an instance of that in the dwarf apple, which is a success. We have an instance of failure in some of the cherries which exhaust themselves. We have an example of dragging the smaller stock along when we graft the Royal walnut upon the common black walnut The Royal walnut just drags the black walnut along where it doesn't want to go at all. So there we have three instances of grafting a foreign visitor upon another stock.

I have taken more than my share of time, Mr. Chairman, but the discussion has been very interesting, indeed. (Applause.)

The President: I am going to take the liberty of asking Dr. Morris one more question, which, perhaps, is of interest to others. In your experience with the golden-leafed chinquapins, from how far South have you secured stock, and how far North will the golden-leafed chinquaqin grow?

Dr. Morris: My specimens I got from a dealer in Portland, Oregon, and they grew pretty far North. The tree ranges from Oregon and Washington down through the lower extremities of the Coast range, but we had better get the northern forms, and there is one man, Carl Purdy, of Ukiah, California, who has the golden chinquapin for sale.

The President: The next subject on the programme is the American black walnut. We have sent to the membership a series of questions about the black walnut which I will read for the benefit of those who haven't this programme.

First. What evidence is there to show that the black walnut may become a valuable nut commercially?

Second. Is quality important with the black walnut, and is there much difference in the quality of different nuts?

Third. What varieties of black walnut are most promising?

Fourth. Is the Thomas black walnut better than many others that have been brought to notice?

Fifth. What are the best methods of propagating?

Now, we have no set paper on that subject. I will call on ex-President Littlepage to make a few sallies concerning the black walnut.

Mr. Littlepage: Mr. President, the black walnut ought to be the easiest subject in the world to talk about. It is a question of how much one ought not to say, however, in a limited time. The pecan tree was my first love. I shall always stick to the pecan. But if I were called upon today, to point out to this Association or to any prospective grower who actually wants to make money raising nuts, and who wants something that will pay the grocery bill and his sixty or ninety day notes, I think I should tell them to plant the black walnut. And I don't think, either, that that is treason, because I think, as we go through with this programme, the pecan will be properly taken care of.

In the first place, the black walnut is a native tree. I have seen it growing, too, on the Gulf of Mexico, and in the Dominion of Canada. Most native trees are immune to fungous and bacterial diseases that destroy so many trees. The black walnut is a hardy tree, and a fine timber proposition. In the second place, it is a fast growing tree. I don't knew just how quickly one could actually produce a black walnut orchard, but, outside of a few trees, such as the black locust and a number of others that do not produce nuts, the black walnut is one of the fastest growers. If you will feed a young walnut tree a small application of wood ashes and some stable manure it will commonly make a growth of six or seven feet a year. Therefore, you don't have to wait a long time for walnut trees to come into bearing.

It is easy to propagate the black walnut. Cleft grafting is one of the simplest methods in the spring. Dormant wood, cut in February or March and put in cold storage, and cleft grafted in the spring, ought to give from sixty to seventy per cent of success. I haven't had experience budding, but those who have say it is easy. Mr. Roper says it is, but grafting is easy and simple. The walnut, like other nut trees, must be propagated by budding or grafting in order to come true. It will not come true from seed.

Up until a few years ago I seldom saw a whole half of a black walnut. The ordinary black walnut cracks about like this (showing picture). Here is a black walnut cracked with two halves, and you can't even see the kernel. The two upper pictures show very beautiful walnuts, but they defy you to get out a whole kernel.

Now, then, when you come to a black walnut like this (showing picture), where you can crack out anywhere from fifty to seventy-five per cent of whole halves, and many entirely whole kernels, the most important problem is solved, and the black walnut has come into the competition.

This variety was discovered by Henry Stabler, and I named it after him. Perhaps one out of every ten of these nuts furnishes a whole, solid, undivided kernel. The other walnut is the ordinary field walnut that has little commercial value for the reason that you can't get the kernels out. It wouldn't make any difference if the nuts grew as big as pumpkins and a million of them on a tree if you couldn't get the meat out of them. I suppose no one will question that the black walnut will grow and bear almost anywhere. It is a weed tree in this part of the country. On President Smith's farm last year I saw them growing everywhere. They grow and bear all over the fields. And, as I said, the question of propagation is rather simple. I think the great trouble we are up against on the farm in America is labor, and that is because you cannot afford to pay good labor. You want a superabundance of laborers in the summer time for two or three months, and expect them to loaf all winter. The farm proposition isn't a profitable one, very largely because of the question of labor, and the farmers of this country must produce something profitable enough to enable them to hire and pay high-grade labor the year round, or they will go broke. They must raise such crops as Alfalfa that they can feed to their dairy cattle, and tree crops that they can use their labor on in the winter time. Nine men are leaving the farm today for every one going there. If you don't believe it, read the census statistics. The reason is labor and because you can't afford to pay it. I don't think there is any profit in selling the black walnut as a nut, but there will be profit in gathering that nut, storing it, and, when your farm crops are all in and you are ready to discharge the labor, put up an ordinary cheap cracking shed and let them crack the nuts for you, and sell the meats That solves the question of what to do with farm labor in the winter time. The walnuts return about ten pounds of meat to a bushel, and a good cracker ought to crack from four to six bushels of nuts a day. Suppose you get only twenty-five cents a pound for the meats and your men crack only three bushels a day each there is $7.50 a day coming in from each cracker, and, besides, you have made a valuable employment for your labor through the winter, and you can afford to pay them for their work. That is why I say the black walnut is, to my mind, one of the best commercial propositions.

I don't know how soon you can bring a black walnut orchard into bearing. Here is a picture of a tree probably seven or eight years old, loaded with nuts. That is a seedling tree. I should think a budded tree would bear sooner than that.

I don't know much about walnut varieties. The Rush and Thomas are excellent nuts. But this Stabler walnut, in my opinion, is in a class by itself in cracking possibilities. It is simply a cracking proposition with the black walnut, and that is, to my mind, about all there is to it. Perhaps, other good varieties will be discovered. Then, suppose we find, after a while, an English walnut much better and more profitable than we have at present, and one that is blight resistant. If you have an orchard of black walnuts you have an ideal stock to topwork to English. I will show you one on my farm with a larger top than I cut off grown in two summers, and it set some nuts last spring. So, if you want a foundation for an English walnut orchard, you can't make any mistake in planting the budded or grafted varieties of these black walnuts.

The black walnut is a beautiful roadside tree. There are different types, the same as with the pecan tree. Here is a picture of curly black walnut wood. The logs were cut from a tree in Kentucky. It took three wagons to haul this one tree to market, and it brought thirty-five hundred dollars.

THE PRESIDENT: I wish to present Mr. Stabler as the original propagator of the tree that bears his name. The nuts of the Stabler black walnut have been pronounced by a good many authorities as the best variety thus far discovered.

MR. HENRY STABLER: Dr. Smith has just introduced me as the discoverer of this walnut. This is hardly fair to Mr. Littlepage, who first introduced and, probably, first propagated this walnut. It was discovered by my grandfather a little over forty years ago. Nothing was done with it at that time for the reason that nothing could be done, but I was not the first one to get the idea of propagating it, because my father, who is here today, attempted to graft these walnuts, and every cion failed.

It seems to me that Mr. Littlepage strikes the key-note in his article in *The Country Gentleman* last spring when he says that:

"Through the efforts of the Northern Nut Growers' Association there was recently discovered a black walnut tree in Howard County, Maryland, producing nuts that crack out seventy-five to eighty per cent of whole halves. The meat of this variety, the Stabler, weighs forty-seven per cent of the whole nut."

That's it, gentlemen. I did not discover this walnut, and without the organization of the Northern Nut Growers' Association I could not have done any more with it than my grandfather was able to do forty years ago, but, as it was, we just took up several samples and the Northern Nut Growers did the rest. The walnut has been attracting more and more attention ever since.

Considering the black walnut as timber, here is a picture of a black walnut log, published in Farmers' Bulletin No. 715, of the Department of Agriculture. The original owner, a farmer, sold the whole tree, standing, for fifty dollars; the buyer felled it at a cost of fifteen dollars, and sold it there for $138.26. It was resold, without being removed, for $164.84, and later sold (the last price is not published) to a large sewing machine factory, but it certainly brought more than that last price which is printed, of $164.84. We occasionally hear of prices of $100 or so being paid for black walnut trees on the stump. The reason we don't hear of such prices being paid more frequently is because the farmer in not more than one case out of twenty gets real value for his black walnut trees. There is a very highly organized and efficient system in the United States of gathering up the black walnut trees which are large enough to use for furniture and other purposes and paying for them as little as possible; but they make a practice of getting them even if they do have to pay more. There was a man living not so far from where I live, up in our country, who had a very fine black walnut tree standing in his yard. One day a man came around and entered into conversation with him, and said, "Mr. Harder, what will you take for that tree in your yard?" "It isn't for sale," said Mr. Harder. "Well," said the man, "I'll give you a hundred dollars for it." Mr. Harder merely shook his head. The buyer dickered along a little bit more and after a while said, "I'll tell you what I'll do; I'll give you $150 for that tree." Mr. Harder said "If you don't get off this place, sir, immediately, I'll shoot you."

I am prepared to say that if you are going to plant trees for timber there is no other tree which will give such a yield as the black walnut, with the exception of the catalpa, and, perhaps, the black locust. It is the most valuable tree we have, and it is the most valuable wood grown in the North. I don't believe, either, the black walnut will ever be less valuable than it is. I know positively that the Stabler tree is not over sixty-five years old, perhaps, not over sixty, and yet that tree, judging from the prices I have seen paid for other trees of similar size, is worth from $125 to $150 on the stump. From the time that tree started until now, it has increased in value at the rate of two dollars a year, for timber alone, to say nothing of the nut. Suppose the tree had been purchased sixty years ago at two dollars from the nurseryman. It would have paid one hundred per cent annually on the investment. It bears, as a regular thing, a crop every other year.

As to what Mr. Pomeroy said about the black walnut not cracking well and crumbling up when it gets to be old, I have some specimens here of the Stabler walnut I cracked this morning, which are of the 1915 crop.

The kernel of these old nuts keeps its flavor and sweetness wonderfully. There is hardly any change in quality within one year, whereas some other nuts, as the hazel and some varieties of the pecan, become rancid after keeping six months.

Dr. Morris: I would like to say one word about the curly walnut. In Maine, not long ago, I saw a young man who had bought a bird's eye maple, perhaps fifty years of age, that he paid $1,500 for. I asked him why he didn't graft one million ordinary maples from that tree and sell the stock at $200 per tree, and then he would have $200,000,000 at just about the time of life when he could enjoy it. Well, that hadn't occurred to him. Now, if Mr. Littlepage will hunt up this curly black walnut stump that sold for $3,500, and if he will graft a million trees from that he will be able to raise a family of ten children (Laughter.)

Dr. Stabler: Mr. President, I just want to call attention to an omission in the little talk that my son gave about the characteristics of this Stabler tree, namely, its beauty as a shade tree. He didn't mention that, and I don't think any one has mentioned it in connection with the black walnut. Now, the black walnut trees, as we meet them along the roadsides, vary exceedingly in habit of growth. The majority of them have very few main limbs, perhaps not over half a dozen main limbs on a tree, and they will be gaunt, ungainly things, stretched out straight, like great arms reaching out with very little beauty. Now, if you plant seedlings, that is what you are likely to get on your lawn. You may have something that is not pretty except as a trunk, but the tree that produces these very remarkable nuts is also one of the most beautiful in its conformation. It is shaped just like an umbrella, rather low, very spreading, and very frequently with a very much larger number of limbs than almost any black walnut tree that I have ever seen, and its habit of growing in the nursery confirms that opinion — that it produces a very large number of buds and branches from each graft.

Mr. Littlepage has in his fence row, uncultivated and surrounded by bushes of every kind, a small seedling walnut that he grafted this year with the Stabler walnut. When he grafted the seedling it was a little over an inch in diameter. I measured the growth from that graft recently, and five shoots measured over five feet long, and others over four feet long. Four month's growth — five shoots over five feet long! Now, I don't know of any other walnut or any other nut tree that would have produced that many shoots from a single graft. It makes a very beautiful shade tree and has a top which is capable of producing very large crops of fruit.

The President: It sometimes makes me feel ashamed of my race when I realize our limitations in comparison with the trees. We run across a valuable type of tree genus, and we can make millions like it in a short time. But when a remarkable specimen of the genus homo, arises, he stays with us but a short while before we cart him off to the cemetery, and that is the last of him. Does any one else wish to make a contribution to the black walnut?

Mr. M. P. Reed: Mr. Littlepage made the remark that it is very easy to propagate the black walnut. We haven't found it so. We have made almost a complete failure of both budding and grafting.

Mr. Littlepage: Well, I was speaking of my experience in grafting this spring. I think I remarked that my personal experience in budding had not gone far enough to tell definitely what the results are going to be. But I put in about fifty-five grafts, and I had fifty of them to grow, and of that fifty there were probably ten or twelve knocked out — thrown out at the first cultivation — and probably thirty-five are growing there yet. I don't know what Mr. White's experience was in Indiana. I think it was, perhaps, not as good as he expected, because of the fact that a lot of the bud-wood dried out, but I think Mr. McCoy can give some experience. Now, Mr. Roper here, has had experience in budding the black walnut, haven't you?

Mr. W. N. Roper: We only put in about a dozen buds a short time ago. I think half of those are growing.

Mr. Littlepage: Well, we budded, perhaps, two or three hundred this summer, and I don't know really how they are coming out, but, from the way these grafts behaved this spring, I don't see any reason why it is going to be very difficult. What do you know about it, Mr. McCoy?

Mr. R. L. McCoy: Mr. Stabler's grafts didn't take very well, but so far as budding the black walnut is concerned, it is just as easy as handling the peach; there is nothing to it when you get the bud-wood; but first you have got to have the bud-wood. You can't jump on to any old tree and get buds that will give satisfactory results. Now, if Mr. Reed and his father had to go into Wisconsin and Michigan to get their bud-wood, and cut it from some old cherry trees, we'll say, and came back to Indiana and tried to produce trees from those buds in the nursery, they would fail.

The President: Well, the net result, apparently, of the discussion on propagation seems to be that Mr. McCoy, in Indiana, has had great success with buds; Mr. Littlepage, in Maryland, has had great success with grafts; I also had great success with grafts put in by a man who could neither read nor write, but who was taught the technique as taught by this Society. Is there any further discussion?

Mr. Littlepage: Mr. President, Professor Hutt ought to know something about the black walnut. He knows something about everything else I have ever talked to him about. I believe he wrote me, in connection with some of his tests, that forty-seven per cent of the Stabler nuts were meat.

Prof. W. N. Hutt: I think so. I think it was pretty close to a half. There were no broken halves at all, and some of them came out entirely whole.

The President: We want to hear from Dr. Deming.

The Secretary: I just want to call attention to one of the questions on our list. "What can we do to cheapen nuts and nut meats in the retail market so as to make this valuable food available to persons of small means?" It seems to me that we are going to do that with such nuts as the black walnut. I think we ought to work for the time when the black walnut can be sold in quantity in New York City, and in all the larger cities for around a dollar a bushel. Perhaps the shellbark hickory is also going to be a nut of the same kind, a nut that can be put on the market in large quantities at a small price, for the man of limited means to buy and crack out himself. Dr. Morris, speaking of some tough nut, once said it was so tough that it was only of interest to squirrels and men out of work. That expression about "men out of work" made me think, as do so many things that Dr. Morris says. If a man out of work can buy a bushel of black walnuts for a dollar, and if he can crack out several bushels a day, or even only one bushel a day, he can make more wages just cracking out that bushel of black walnuts than at ordinary laboring work. I think that we ought to get on the market a supply of cheap nuts for the man of limited means and that we ought to educate the people to a knowledge of the value of such nuts.

The President: It is always well to put the brakes on. I haven't heard a thing about this black walnut except virtues. I believe Mr. McMurran, of the Department of Agriculture, is present, and I think he has been giving particular attention to the black walnut, and perhaps he will tell us of some of its enemies, either animal or vegetable.

Mr. S. M. McMurran: Well, Mr. President, unfortunately, I haven't given much attention to the black walnut. My time has been given to the pecan until this summer, when I worked on the persian walnut to some extent, but I can say, generally, that the black walnut hasn't got any very serious enemies. Everything it has got is right here now. There isn't any reason to suppose that it would have any serious disease if we cultivated it on an extensive scale.

As to the insects, I am not able to state. I have never noticed any particularly on the nut since a boy.

Mr. Littlepage: Mr. President, I think Mr. McMurran has covered the diseases of the black walnut. I think the observation of every one will confirm what Mr. McMurran has said.

The President: The chair will deviate from parliamentary practice for a moment by discussing the question. I wish to contribute three small facts. One is with reference to the special growth of the black walnut under fertilization. The men on my place have to cut bushes around apple trees, and some stray black walnuts planted by nature under those trees have been cut for 10 years but for the last two seasons have been left alone. They have promptly come up through those apple trees, under the influence of nitrate of soda, like a steer going through a bush. They have grown five or six feet each season.

Another point is the great variation, apparently of the black walnut with regard to its keeping qualities. I recall putting away in a garret, in 1894, a number of bushels of a nut of particular merit, and they were perfectly sweet and edible as much as seven years later. Now it is only occasionally that you will find one that will keep as long as that, but with the trees bearing every two years, it is quite possible that the fruit would be marketable for two or three, or even four years afterwards, if kept properly.

There is no reason to think that the Stabler is the best nut growing in the United States. It merely grew within reach of the eyes of observing men.

The filbert and the almond we hope to cover briefly before adjourning. I will ask Mr. Reed to give us a short contribution on the almond.

Mr. M. P Reed: This almond (exhibiting specimens) we received scions of from Mr. C. A. Reed, of the Department a few years ago. It was three years ago this summer that we top-worked it, and we picked almost half a bushel of almonds from it this summer. The almond has a thick shell, kernel of good flavor, but I don't think it will amount to anything very much except for home use.

Mr. Littlepage: How old was the tree that bore them?

Mr. M. P. Reed: Top-worked three years ago this summer

Mr. Littlepage: And bore how many?

Mr. W. C. Reed: Bore a half a bushel this last summer.

Mr. Littlepage: If any one here would like bud-wood of that almond I will be glad to send it to them.

The President: Mr. Littlepage offers to send those present bud-wood of that tree, which can be, with great ease, top-worked on the peach by the ordinary process of shield budding.

Dr. Ira Ulman: I have grafted scions of this nut on Amygdalus Davidiana, the new Chinese peach of the Department of Agriculture, and the growth is marvelous. It does just exactly as Mr. Reed told you.

Dr. Stabler: I would like to ask whether the almond is attacked by the same insects and diseases that affect the peach, whether it is affected by peach yellows and whether it is affected by the peach borer. I understand that the apricot is, in a measure, immune to the peach borer at least, and possibly also to the peach yellows. If the almond is to be short-lived like the peach tree, it may not be nearly as valuable as if it were a hardy tree. If you place it upon peach stock it seems to me you must expect it to be attacked by the peach borer.

Mr. M. P. Reed: I believe that the original tree of this variety is something over sixty years old. Not very many peach trees live to be that old, and in the nursery it is a very vigorous grower.

The President: The commercial almond is a rather long-lived tree in the countries where it is grown. Of course, here is a question of technique and individual behavior which only experience can answer. We ought to take some of these nuts home that Mr. Reed has given us. I should like to know why Mr. Reed so deprecates a tree which bears so much fruit in so short a time. If the fruit is good, why can't it be handled commercially?

Mr. M. P. Reed: It is the cracking quality. It has a very thick shell.

The President: Is that a problem that machines cannot solve?

Mr. M. P. Reed: No, sir.

Mr. Littlepage: How is the flavor?

Mr. M. P. Reed: The flavor is good.

Mr. Littlepage: I was just going to say, Mr. President, that I visited Mr. Reed's place this summer, and it is utterly surprising how fast and beautifully this hardy almond grew. He took me out at the edge of the garden where he has them growing, and I could hardly realize that they were only three-year-old trees. They were as full of little almonds as the peach trees were of peaches, only they were much longer and with very red leaves. Vincennes, Indiana, is on the thirty-ninth parallel, which is the northern boundary of the District of Columbia, and it gets much colder there than here, and those trees haven't the slightest sign of winter-killing. I don't know anything about the quality of the meat, but they are certainly wonderful bearers.

Dr. Morris: I find that in the region of Stamford, Connecticut, hard shelled almonds do pretty well if you look after them pretty closely, but they take all your time. They have so many different blights on them that I am glad mine died a long time ago. They bore heavily, but they were too much trouble. They blossom so early in our locality that the blossoms are apt to be caught by frost. You may overcome that if you set the trees on the north side of a stone wall where the ground retains the frost for from one to two weeks later than on the south side. I find, that by doing this you can retard their time of blossoming sufficiently to materially lessen the danger of their being caught by spring frosts.

Mr. Harry R. Weber: Will you get the same results if you put a mulch under the tree? Won't that prevent thawing and hold the tree for a week or two?

Dr. Morris: Yes, sir.

The President: Have you used this particular almond?

Dr. Morris: One very much like it, and it was a mighty good almond — hard to get at but good.

The President: I would like to ask Mr. Reed as to the blooming time of this particular tree in comparison with some standard peach like the Elberta.

Mr. M. P. Reed: It bloomed about a week earlier than the Elberta, and the peach crop is light.

Mr. Henry Stabler: I have been associated for the past three or four years occasionally with Mr. M. B. Waite, of the Department of Agriculture, and I have had a good chance to study the effect of spraying on peaches in preventing brown rot and curculio. At Mr. Littlepage's I observed an almond tree that started, I should think, with twenty-five or thirty almonds on it this spring. Those almonds gradually succumbed to the curculio and brown rot until, at last, only one was left, and it seems to me that, if this almond is to be grown commercially in this climate, we will have to use the same methods of growing as with peaches, and we will have to spray them.

The President: I think the chief benefit of the discussion of the almond would be to get more of us to try it, and the fact that we have one which is only one week earlier than the Elberta peach in blooming shows that we have a good chance, possibly, of even exceeding the possibilities of the peaches.

Mr. McCoy: Mr. President, I notice a good many almonds bloom about the same time as Elberta peaches. I have probably twenty-five trees of this almond that Mr. Reed spoke of, and I think they were in bloom at the time the peaches were. It is very productive, just as he says. I have noticed some of the old trees around in our neighborhood have borne good crops for several years, and I don't notice much disease on them either.

Dr. Stabler: I asked the question whether anybody knows whether the almond is affected by peach yellows, and nobody seems to know, but peach yellows is something connected with climate. There is a yellows line that has remained definite and distinct for the last twenty-five years, and you can describe that line on the map, and it stays right where you put it. All north of that line the peach trees are affected by yellows, and south they are not. That line runs through Mount Vernon and Annapolis, and across Chesapeake Bay to Chestertown. Now, below that isothermal line there is a little peninsula south of Chestertown, in Kent county, a little peninsula there — a little long neck that runs out into the bay below Chestertown — where they have never had any peach yellows, and yet at Chestertown the trees have always been affected by peach yellows, and it is probable that it will be found, if the almond is affected by peach yellows, that the same laws apply to it. That is, south they will have the yellows, and north they will not. Now, at Vincennes, I suppose that they are north of the yellows line for peaches. Do your peach trees have peach yellows?

Mr. M. P. Reed: No, sir.

Dr. Stabler: Perhaps you are north of it, then. If so, the almond hasn't been tried out as to yellows.

THE PRESIDENT: This association is greatly indebted to Dr. Morris, who helped to get it together, for his indefatigable searching of the corners of the earth for specimens, species and varieties of trees in his ambition to get to his Stamford place all of the varieties of nut-bearing trees. Several of our members have taken a little interest in the question of the hazel-filbert family. Dr. Morris has taken a lot of interest. Last year he gave us a most exhilarating presentation of the subject, and he is this year going to give us some brief notes on the progress of his knowledge concerning the hazels and filberts. Dr. Morris.

DR. MORRIS: Just a word, in order to start the discussion. I have tried to work out during the past year two or three points that came up for discussion last year. I stated that in Connecticut the common American hazel would probably not become a horticultural proposition for the reason that the main stock seldom lives more than seven or eight years, and then dies. New stolons, starting from the root, make abundant new stocks. In that way, dying at the center, and growing at the periphery, like a ring worm, one plant may extend so widely as to drive cows out of the pasture lot. (Laughter). Dr. Deming understood me to say that it spread so "rapidly" as to drive the cows out of a lot. I said "widely," not "rapidly." (Laughter). For that reason a plant of our common hazel bears a few nuts about the third year; it bears a good crop about the fourth year and sometimes in the fifth year. It then begins to die and is gone by the seventh or eighth year, while new stolons, coming up on all sides, are ready to perpetuate that rotation. That, at least, is ordinary hazel history in my part of Connecticut. So I doubt if this species will ever be a good horticultural proposition.

This year, for the first time, I have budded the European hazel upon our common stock for the purpose of observing whether the character of the guest will change the character of the host.

Now another point. Many of the European hazels that have been brought to this country, I find, do not bear for the reason that they flower so early that the staminate flowers are caught by frost — not the pistillate. The pistillates will hold out against frost for a long time and make good. There are two or three ways for overcoming this difficulty. We may select for cultivation those kinds which bloom a week or two, or even three weeks later than others, as in the case of the Bony Bush variety.

There is hardly any more valuable tree in Central Europe than the purple leafed hazel. I never have seen one bearing in this country. Its staminate flowers come out too early in Connecticut. I have now some in which I have grafted the Bony Bush, which flowers so much later that I hope to have my purple hazels bearing nuts at Merribrooke.

On the whole, most of the points have been simply confirmatory of points previously considered. We need not fear hazel blight because it is very easily controlled, and many of the European hazels will furnish an immensely valuable crop for almost all parts of temperate America. We may develop, by breeding and by cultivation, types which will be hardy, which will give us large, valuable, marketable crops, and which will be desirable from the market man's point of view.

Dr. Stabler: Can you get stocks that are free from blight?

Dr. Morris: Last year I showed specimens of blight. The blight, fortunately, begins upon a fairly large stem — upon a part of the stem that is in plain sight. It takes from two to four years for a patch of that blight to encircle a limb. If one will go over his hazel orchard once a year and, where a bit of blight appears, cut it out with his jack-knife and later paint the spot with a little white paint, one can very readily control hazel blight. It is so easily done that we need not fear it at all.

The President: Dr. Ulman, I believe, is a hazel enthusiast.

Dr. Ulman: I have attempted to gather as much information as I could by seeking out the failures with hazel because I had found no one reporting success. In answer to a large number of letters which I sent out I received some 290 replies which reported failures with the European hazel. Dr. Morris tells us that blight can be readily controlled. So far, that does not seem to be the experience of others, but it is only fair to say that they do not know how to get rid of it in the way that Dr. Morris has told us.

The President: Dr. Ulman, I should like to ask if it is not true that the hazels growing at Rochester could be added to your collection of 290 and change this complexion a little bit. Certainly last year we saw hazel trees almost the diameter of this room which appeared to be perfectly healthy.

The Secretary: Can we recommend the hazel to be planted commercially?

The President: If the hazel propagates by underground stolons automatically, why can we not take the stolons and plant them in the places that the trees have abandoned, letting them run on elsewhere?

Dr. Morris: In regard to Dr. Deming's question, green European hazel nuts are now selling in New York, out of cold storage, at seventy-five cents a pound. Green hazel nuts like green almonds are prized by the gourmet. All of the European hazels will eventually furnish a good commercial proposition provided that the market is large enough, and the market will probably grow, is growing in fact. Ripe filberts bring, approximately, from ten to fifteen cents a pound. The trees bear well, and I don't know of any reason why the hazel proposition should not be a first rate one right now. The thing to do is to select kinds which we know are valuable here. One may go through the seedling orchards at Rochester and select one parent which bears large nuts prolifically, and then propagate any number of European hazels from that one stock. My Bony Bush is probably a desirable hazel.

In regard to the question of breeding from stolons, if we can keep that thing going it would be all right, but it requires so much work I doubt if we shall do anything in that way with the American hazel. The European hazels don't travel by stolons. That is the advantage. So I have given up the common American hazel as a commercial proposition. A number of European and Asiatic hazels will be commercially profitable, unquestionably, just as soon as we care to develop them.

Mr. Weber: What do you know about the hazels of the Western coast?

Dr. Morris: Very profitable in parts of Oregon and Washington. They have a large, good crop, which sells locally, but, like most Pacific Coast fruits, the nuts lack flavor and quality. They have size and beauty, but lack quality. The fruits and nuts grown on the Pacific Coast all lack a certain fineness of character, for some reason yet unknown.

You have got to look after your European hazels, and not neglect the orchard. I remember seeing some very beautiful apple trees in central Maine not very long ago — no blight — no codling moth, and the trees free from almost everything in the way of insects or fungous troubles — beautiful, cultivated trees, and beautiful apples on them. I asked another man, one of my acquaintances there, an old farmer, why he didn't set out a lot of similar trees and make a good income. He said, "Well, it won't go." He had a pasture about eight miles north of there, and, said he, "I spent thirty dollars for apple trees to put into an orchard, and I had great ideas about those apples. I set the trees out in that orchard about three or four years ago, and last year when I went up to look at them, there were hardly any apple trees left." He hadn't looked at them for three or four years. (Laughter.) You can't raise hazels that way.

THE SECRETARY: The reason I asked about the commercial value of the hazel is that my own experience has been very unsatisfactory. I got some hazels from Gillet, on the Pacific Coast six or seven years ago, set them out around my place, and they have grown beautifully. I haven't been able to detect any blight on them anywhere. Some of them are fifteen feet high, have grown luxuriantly, and blossom every year, but I haven't seen one nut yet. On the other hand, the other day I visited a man near my home, who told me that he had raised some trees from nuts which he had bought from an Italian grocery on the corner. He gets the nuts when the crop first comes in, and stratifies in wet sand all winter, and he says they all grow. He had some beautiful hazel trees. One I estimated to be twenfy feet high. I never saw a hazel tree which approached it. He said it was only five or six years old. Last year he had a fine crop of nuts from it. This year, however, he said that during a warm spell in the winter the staminate bloom came out and was killed, and there were no nuts on the trees. Now it seems to me that there is great uncertainty about the hazels, and I don't know exactly what to advise people to do. People ask me for advice as to what nuts to plant commercially. I don't know whether to advise them to plant hazels or not, and I don't know what varieties to advise people to plant. I don't know how to advise them to overcome this difficulty of the early staminate bloom and the winter killing. I can't now conscientiously recommend people to plant hazel nuts commercially.

DR. MORRIS: Go to Rochester and get some there that bloom every year and that bloom later. My Bony Bush blossoms some three weeks later than the others, I presume. It is a bush that bears well every other year, apparently.

THE PRESIDENT: Are there any further questions about this large family of nut trees of which we have but a small corner of knowledge? If not, we may look to an adjournment.

First, I wish to announce that this afternoon we are going to devote to an excursion around the city, to see some of the most remarkable Persian walnut trees which I think may be found anywhere.

I am asked by Prof. Close to say that the Department of Agriculture has an exhibit of nuts on the fourth floor at 220 Fourteenth Street, Southwest.

Meeting adjourned.

FRIDAY, SEPTEMBER 8TH, 2 P. M.

Meeting called to order by the President.

THE PRESIDENT: Dr. Metcalf, Chief of the Bureau of Forest Pathology, of the Department of Agriculture, has been in charge of the investigations concerning the chestnut blight for a number of years.

DR. HAVEN METCALF: Mr. Chairman and Members of the Society: I will present, first, a few general facts regarding the present status of the chestnut bark disease, and, for the greater part of the information you desire, I will rely on you to ask me questions.

The chestnut bark disease is getting to be an old story, but that plant hyphenate, that objectionable imported disease, is more of a live issue today than it ever has been before. All my attention during recent months has been taken up with another imported plant disease, the white pine blister rust, of which you have heard, and which does not concern the special subject matter in which this Association is interested, unless, perhaps, you may be interested in the piñon nut as the piñon pine may ultimately be subject to attack by blister rust. However, this disease, like the chestnut blight, is an example of what a relatively harmless, or at least, not serious disease in a foreign country can do when it is permitted to get into the United States.

This brings us to the question of the origin of the chestnut bark disease, which, although the story has been told many times before, has been the subject of so much dispute that I probably had better recapitulate that matter. It has been proved beyond question that the chestnut bark disease is a native of eastern Asia, China, Japan and Korea; that it was introduced into this country in the '90's, upon diseased chestnut nursery stock. It was not critically observed until 1904, but the condition of trees which were observed at that time shows conclusively (provided the disease progressed in those early years as it has since) that it was introduced into the country as early as the late 90's. The final demonstration of the fact that the disease is a foreign disease and a native of Asia we owe to Mr. Frank Meyer, of the Office of Seed and Plant Introduction, of the Department of Agriculture. Mr. Meyer's observations are so interesting that I will pass around a few pictures illustrative of his observations in China, the first picture showing the country that is the home of the chestnut bark disease. The second picture shows a chestnut orchard in China where the trees have, with characteristic thrift, been planted around human burial mounds. The remaining pictures show how the chestnut blight acts in China — very differently from the way it acts in this country. In China, it produces, as the pictures show, definite cankers, which do not girdle the tree, which kill young trees occasionally, mutilate old trees, kill branches, but the cankers do not girdle the trees. That disease has been known in China we have no idea how many years, and, while it does a certain amount of harm, is said by Mr. Meyer not to be really serious in China. You can readily see, upon examining these pictures, that there is a sharp contrast in the behavior of the disease as observed in China and its behavior as observed in this country, where it will girdle a comparatively large tree and the fungus spread all through the bark, completely covering it, and doing that in a very short time. Of course, then, the chestnut blight is one of those cases of which we have so many, where a disease, passing to a new country, finds new surroundings, hosts more favorable to its development, and progresses rapidly.

The natural range of the chestnut bark disease at the present time — that is, I mean, its range on the native chestnut and the range through which it is now spreading by non-human agencies, is, on the north, practically co-extensive with the range of the native chestnut. The disease is found in Maine, New Hampshire, Vermont, as far south as Virginia, and as far west as western Pennsylvania and eastern West Virginia. Throughout this area it is spreading by what I may call natural means, and the disease has been shown to be unusually well provided with means of dissemination. I will speak a little later about the spread of the disease outside of this area — that is, west and south, since in the West and in the South it is being spread, as far as we know, exclusively by human agencies.

The question is often asked me, "What is the future of the chestnut — that is, the native chestnut — in this country? What is the course of the disease going to be?" The only way in which we can answer that is to look in the parts of the country where the disease has been present longest — Long Island, for example; Westchester county, New York; Bergen county, New Jersey; Fairfield county, Conn. Upon a recent examination of those areas I found no chestnut trees surviving in a healthy condition. We have, of course, from the beginning, hunted, and hunted hard, to find individual chestnut trees that might be immune to the disease — native American chestnuts. We expected to find such trees, but up to date we have not found them. It is a very extraordinary fact and an almost unparalleled fact, because with the majority of plants affected, by any given disease, we can find some individuals that are not only resistant, but immune.

Now, in these old areas, particularly on Long Island, in 1907, when the disease first came under my observation, I marked certain trees in order to observe how long the stumps of these trees or the dead trees would continue to send up sprouts from the ground. It is an interesting fact that some of those trees which were dead in 1907 are still putting up sprouts. The sprouting capacity of the chestnut tree is indeed marvelous, but I am sorry to say that I haven't been able to find any healthy sprouts over three years old. I haven't been able to find any living sprouts more than four years old. The disease seems to be following up the sprouts as it followed up the original stem.

Right there, in the behavior of the disease toward the sprouts, we have an interesting fact. During the first year of its life the chestnut tree or the chestnut sprout is immune to this disease, or practically so. You can rarely find a seedling or sprout of the first year that is attacked by the disease, and even in the second or third years a comparatively small per cent of them are attacked. It is thus possible to produce chestnut nursery stock that for several years does not show the disease.

So far as I can see, the chestnut blight is not stopping naturally in its course anywhere. I cannot get a particle of reliable evidence that it is. In this part of the country and to the south of here, in Virginia, for example, the parasite has more months in the year during which it can grow, it appears to be utilizing that time in spreading more rapidly, at least killing trees more quickly, than to the north of this area. From the standpoint of the grower of nuts, the important question is, of course, whether the disease can be controlled. I think your Secretary, in a recent article, summed the situation up as clearly and briefly as can be done. He said, in an article entitled "The Progress of Nut Culture in the East:"

"Of the chestnut we have excellent varieties such as the Rochester, Boone and Paragon, but all development in the culture of this nut is being held up by the blight. Everybody is awaiting the results of the government work in breeding immune hybrids. There may be great opportunities, nevertheless, in chestnut growing outside its native area, where the blight can be controlled."

There is no doubt that in an orchard tree, in chestnut orchards, the disease can be controlled within reason by the cutting out method that has long been advocated, but the point is that the margin of profit on the chestnut is not sufficient to make that method pay, and whenever members of this Association or others interested in the propagation of chestnuts have written to me for advice I have simply advised them not to plant chestnuts at present. I cannot see at the present time, that any attempt at control is profitable. That is a very different thing from saying that it can not be done, or that it may not later become profitable.

A few words regarding the method of spread of the disease. In 1908, when the office of which I have charge was first organized, Professor Collins, who has addressed this Association a number of times regarding this disease, visited a number of orchards and nurseries in the Eastern States, going as far as southern Virginia to the south, and west as far as York county, Pennsylvania. Although that was comparatively early in the progress of the disease, wherever he went, without exception, where there was a nursery, he found the disease present and spreading onto the native trees. There were, however, several established orchards which he visited where that was not the case, where the disease was not present. It has been brought out repeatedly that, while the chestnut blight is marvelously adapted to spread by natural means — wind, birds, insects, rain, all the ways in which a plant disease ordinarily spreads — the way in which it spreads over great areas and through great distances is on chestnut nursery stock.

In that connection, then, I may briefly discuss the present range of the disease so far as we know it, outside of the natural range of the chestnut tree. South of Virginia, so far as we know, the disease is present at only one point (Greensboro, N. C.), where it was introduced in a nursery and spread to native trees. In stating this area of distribution, I ought to say that for about a year and a half we have made no special effort to determine the range of this disease. I mean we have not gone out of our way to do it. We have simply collected such evidence as has come to hand casually, and so it may be that there are now other points of infection in North Carolina, or south of there, but, if so, we do not know of them. In Ohio, the disease is present at three points, of which one is a large and serious infection at Painesville. In Iowa, it is present at one point, Shenandoah, in a nursery. In Indiana, it is present at five points; in Nebraska, at two points. In Michigan, one point has been reported. In all of these cases it is in nurseries, or on very recently planted trees. There is, or was, an interesting point of infection in British Columbia. Probably the trees there are all dead by this time, but that point is very interesting as being probably an independent importation from the Orient.

There needs to be little said as to how the disease is spreading in this area. Perhaps the best thing I can do is to read some letters that have come to my attention:

"MICHIGAN AGRICULTURAL COLLEGE,

"EAST LANSING,

"Aug. 18, 1916.

"Dr. Haven Metcalf,
"U. S. Dept. of Agriculture,
"Washington, D. C.

"Dear Mr. Metcalf:

"Last December, the Forestry Department of this College ordered of Glen Bros., Glenwood Nurseries, Rochester, New York, five 6-foot trees of the Sober Paragon chestnut. These were shipped to them April 4th and were almost immediately planted in the Forestry Nursery here. About six or eight weeks ago, the Forestry Department noticed that these trees were dying and called our attention to this matter about four weeks ago. I examined the trees in company with Mr. J. H. Muncie, one of our assistants, and found all the external appearances of Chestnut Blight with, however, only a very few imperfectly developed pycnidia. We brought pieces of the bark of these trees into the laboratory and made cultures and obtained the typical mycelium of chestnut blight. The trees have been removed and we now have them in our laboratory.

"I am calling this to your attention as the trees were doubtless infected when shipped. I feel that you ought to know that this firm is sending out diseased trees.

"Very truly yours,
"(Signed,) ERNEST A. BESSEY,
"Professor of Botany."

The following is an extract from a letter from Frank N. Wallace, State Entomologist of Indiana, dated July 13, 1916:

"My Dear Sir:

"Under separate cover I am sending you some samples of chestnut blight which I secured from some trees shipped by Mr. C. K. Sober, Lewisburg, Pa. Mr. Sober doubts that we have even seen a case of chestnut blight and wanted some samples and I sent him the other half of the samples which I am sending you.

"I have been trying to check up on some of Mr. Sober's trees and so far I have found nearly fifty per cent of them have died from chestnut blight disease."

The samples sent with this letter showed typical chestnut blight.

Some months ago Dr. W. H. Long, of Albuquerque, New Mexico, became interested in the possibility of growing chestnuts in that country and communicated with Glen Brothers, of Rochester, N. Y., to secure certain information regarding them. He secured the information he wanted and also some that was slightly gratuitous. I will read extracts from the two letters:

"In regard to the blight, which you call the Eastern Chestnut Canker, would say that this tree is practically immune from this disease, and you would stand no more chance of having your chestnut trees infected with the blight should you plant them, than you would if you planted apple trees, of having them infected with the San Jose Scale or peach trees, of the Peach Blight.

"There are over half a million trees at the famous Sober orchard in Paxinos, Pa., none of which have the blight, and yet the blight rages all around them in the American Sweet Chestnut groves that are all through the mountain. Further evidence of its immunity from this disease we cannot guarantee. We think this speaks for itself.

"We believe that if you would investigate this variety that you would plant an orchard of Sober Paragon Chestnut trees, even if not a very large one. We should like very much, indeed, to serve you and shall give our personal attention to the selection and shipment of such trees as you may require.

"Very truly yours,
"GLEN BROS., Inc.
GM-AB "(s) John G. Mayo."

The President: Would you mind giving us the date of that last letter?

Dr. Metcalf: That is October 20, 1915.

The other letter signed by Mr. Mayo is as follows, and is dated Oct. 29, 1915:

"Replying to your October 25th letter we do not think that you or your friend need have the least anxiety on account of the chestnut blight reaching your section. This disease seems to be confined to a very small area in northeastern New Jersey, southeastern New York, and southwestern Connecticut. The disease has been in existence in this country since 1842, it has made very little progress, and the highest authorities now state that it seems to be on the wane." (Laughter.)

Mr. Littlepage: Do the experiments of the Department show any possibility of control of the disease?

Dr. Metcalf: I don't think that there are any methods of control which can profitably be applied to orchard trees under present commercial conditions. If a man has a few orchard trees which he regards as novelties and to which he is prepared to give very careful attention, I think the disease can be controlled. So far as I can see, the only hope of commercial control lies in none of the present varieties, but in Dr. Van Fleet's hybrids, possibly in the Chinese chestnut, and, aside from the objectionable qualities of the Japanese nut in certain strains of Japanese. With the rapid withdrawal of the wild chestnuts from the market, however, the price of chestnuts may rise, and control methods in orchards become practicable.

Mr. Littlepage: Mr. McCoy has been in Pennsylvania and has come back with the very optimistic idea that the chestnut blight was under control up there. I took him out on my farm in Maryland and showed him my trees, and that the only thing that could destroy the trees faster than the blight is a forest fire.

Dr. Metcalf: Exactly.

The President: I believe, Dr. Metcalf, you conducted a series of spraying experiments recently, and I understand that others have done the same thing. Mr. P. A. Dupont, I believe, on his fine estate near Wilmington, tried to spray a few chestnut trees with Bordeaux mixture, and I understand he gave it up as a physical failure, to say nothing of the cost. Am I right about that?

Dr. Metcalf: That is my understanding, that he was dealing with large trees and failed.

A Member: Well, did you succeed with small ones?

Dr. Metcalf: In the line of spraying? That is a long story, and I suggest that Mr. Hunt answer that.

Mr. Hunt: In the spraying work conducted on Dr. Smith's place at Bluemont, Va., we had 2500 numbered trees under observation; about 1500 of them being sprayed. Equal numbers of trees were sprayed with Bordeaux and with lime-sulphur. The number of sprayings given different lots of trees varied, but even trees sprayed as often as every fifteen days blighted in a number of instances. While I did not get a greatly reduced percentage of blight (approximately 50 per cent) among the sprayed trees taken as a whole, the difference between individual plots seemed to depend rather on location in the orchard, as some blocks of unsprayed trees showed practically no blight and some blocks of sprayed trees showed considerable blight. I might say that the grafted trees did not blight nearly so heavily as the ungrafted trees. So far as any real success is concerned there was none. It would cost over one hundred dollars per acre per year to spray as often as some of the trees were sprayed, and it wouldn't control the blight. So I wouldn't consider it at all practicable.

The Secretary: What is the reason that the grafted trees blighted less than the ungrafted?

Mr. Hunt: Well, I wouldn't pretend to say as to that, except that it is so. I had each tree numbered and kept an individual record of all the trees, and I found — I have forgotten the exact figures — but there was about three-fifths as much blight among the grafted trees as among the ungrafted trees. Of course, they are an imported variety, I believe, and it may be that on that account they may have developed some resistance. But Mr. Van Fleet may know more about that.

Dr. Metcalf: There seems to be some evidence that the imported European varieties have a slight degree of resistance, not enough to count, but enough to show in that fraction that Mr. Hunt gave.

The Secretary: It is only a varietal condition, then, not from the fact of grafting, but simply because of a different variety?

Mr. Hunt: Oh, yes, I think so.

Mr. Littlepage: Mr. President, in view of this information about the chestnut, is there the slightest use in the world for this Association to encourage anybody to plant chestnuts anywhere in the United States?

The President: Dr. Kellerman is here, and I wish to refer to him Mr. Littlepage's question with a slight addition. Is there, first, any prospect of any place staying immune? Second, would it not be to the advantage of the country if the sale of chestnut stock were stopped?

Dr. Karl F. Kellerman: Mr. President, to answer those questions involves a rather large contract on my part. (Laughter). In the first place, the problem of growing and marketing chestnuts, I think, is one that I could hardly be expected fairly to discuss. I am here rather to explain the attitude and action of the Federal Horticultural Board than to try to give any constructive advice to the nut growers.

The Federal Horticultural Board is a board of five men to advise the Secretary of Agriculture in establishing plant quarantines, either on the introduction of plant material into the United States, or on the movement of plant material inside the United States within the quarantined areas. The Horticultural Board, therefore, has to deal more with actual conditions than with outlining such policies as your chairman has asked me to outline.

The President: Excuse me, Dr. Kellerman, but we wish to know if there is, in your opinion, any prospect of any region remaining immune?

Dr. Kellerman: Well, even that is going rather further than I would like to go, and yet the negative answer to that question is practically the basis on which the Federal Horticultural Board decided that it was impracticable to quarantine infected areas at the present time. The evidence at hand appears to indicate conclusively that if the trees that are to be grown are distinctly susceptible to the disease they will almost certainly have an opportunity to become infected, no matter what part of the United States they may be grown in. Now, whether that infection would be a matter of a few months, or a few years, or a few decades, of course, would be altogether a matter of chance, but, with the wide distribution of nursery stock that is infected, with native chestnuts rather generally infected and continuing to be infected, and with practically no chance of preventing the continuation of the disease in the native chestnuts, abundant sources for infection of susceptible material appear to exist. For that reason, it appears to be, from an economic standpoint, inadvisable to attempt to check the disease through the establishment of quarantines.

THE PRESIDENT: Dr. Kellerman, you have answered my first question to perfection, and now I want to ask the second one. If this blight is practically a sure-kill, isn't it wrong to permit people to spend money in the hope that, in some way, they are going to escape it? And if that is the case, why shouldn't the whole traffic in chestnut trees be stopped, with the possible exception of experimental things, which might be allowed with the direct permission of some governmental board?

DR. KELLERMAN: That is a question that is very much harder to answer. There might be favored regions where orchard culture of the chestnut could go on for a considerable term of years before infections became general and before the industry would be stifled because of this disease. That is merely a matter of conjecture, as I see it. We have so little evidence as to the speed with which a paying orchard business can be developed in a new locality, so little evidence as to how the disease may act under widely separated climatic conditions, that I don't feel that we are prepared to say definitely that the industry is bound to fail in every place where it is tried. Personally, I think that it ought to be considered only on an experimental basis, but that represents merely my personal opinion, and I doubt whether there is any effective means for establishing a policy of that sort. It might be possible for the general advice to be given that there was danger in any orchard planting of chestnuts, no matter where it might be undertaken, and of a comparatively rapid loss through the chestnut blight. I doubt whether more than that would be feasible.

The President: I have been enthusiastic over the chestnut for twenty years this season, and these are matters in which I am greatly interested. As I see it, the problem is one that is really much bigger than the chestnut. The whole field of nut growing, which is now on the edge of great accomplishments, is likely to be seriously injured, because the most conspicuous thing in nut growing is the taking advertisement of the firm whose bad trees have been referred to by Dr. Metcalf. I think we do not appreciate the seriousness of the situation. The firm Dr. Metcalf referred to is selling trees that are diseased in places where they are sure to die quickly. Other men are similarly selling trees, with less skillful advertising, perhaps, but probably no less diseased. Most of these nurserymen may be honest in their belief that they are putting out stock that is not diseased. But in the infant trees it is almost impossible to detect the blight, so that the tree goes out looking like a perfectly good one. It may be two or three seasons before it dies.

Now, the economic aspects are these: Who should stand the loss, the man in the nursery or the man in the orchard? It is a toss-up, it seems to me at present, with the results apparently in favor of the nurseryman rather than in favor of the citizen. The people who have an interest in nut growing are going to have that interest lessened or destroyed by beginning with a bad kind of tree. There are possibilities of a great national injury, as I see it, if we let this thing go on.

Dr. Kellerman: Well, as a constructive policy for aiding in the establishment of nut culture, I think your policy is sound, but as a question of economics of operation, I doubt whether any plan of that sort can be established, beyond the plan of merely giving the general advice that such planting is attended with very grave risks.

The President: Have you not authority, or does not authority exist, to prohibit shipment?

Dr. Kellerman: The plant quarantine act gives the Department authority to quarantine infected areas and to place certain restrictions on shipments. To place any such restriction, however, it must be plainly established that beneficial results are going to result, not to a particular industry necessarily, but to the general public. The difficulty in establishing a quarantine on the shipment of nursery stock is the apparent impossibility of saying that that is going to stop the spread of the disease. That is one question. The other problem is the difficulty of determining what is infected territory and what is not. We have very serious difficulty in making regulations, excepting as between definitely infected territory and definitely clean territory.

THE PRESIDENT: And you don't have the authority to make a sweeping, blanket prohibition of the shipment of a certain thing?

DR. KELLERMAN: No, we haven't that authority.

MR. M. P. REED: We put a clause in the printed matter that goes out with all of our shipments saying that chestnuts are subject to blight, and that we don't recommend their planting. I think if nurserymen all followed that principle everybody would buy with their eyes open.

THE PRESIDENT: I am sorry you are so lonely in the business. (Laughter.)

MR. LITTLEPAGE: As regards the possibility, or the impossibility, of doing any good to the chestnut industry by quarantining it, I fully agree with Dr. Kellerman. I think any attempt of the Board to quarantine, so far as benefit to the prospective chestnut grower is concerned, is perfectly useless.

DR. ROBERT T. MORRIS: It seems to me it may be resolved into a very simple proposition. Now, chestnuts may be raised in orchard form if we spray with Bordeaux mixture, and cut out blight when it appears. I do it. They live. Those that are not sprayed die, unless given tiresome attention. That settles that question for my part. Chestnuts may not be raised in forest form because it does not pay to spray and cut to that extent. But chestnuts may be raised profitably in orchard form by people who are willing to take the trouble to spray them, and to cut out blight early. It seems to me that people should be properly warned that they may plant chestnuts in orchard form provided they are willing to look after them, otherwise we ought to guard against the public buying chestnut trees, unwarned.

MR. LITTLEPAGE: Dr. Morris, were you in when Mr. Hunt made his statement?

DR. MORRIS: I got in late.

MR. HUNT: I sprayed fifteen times, every two or three days during the blossoming season.

DR. MORRIS: I used arsenate of lead with my Bordeaux mixture for the reason that it is convenient. That makes it stick ever so much tighter. Now, that may be a feature of my confidence.

Three or four heavy storms will not wash off my Bordeaux mixed, applied in that way, with arsenate of lead.

Mr. Hunt: Well, my trees are dying right along.

Dr. Morris: I am right in the midst of the worst chestnut blight conditions. The only kinds I have that are not blighted are sprayed trees, and chestnuts of kind that resist the blight. I had twenty-six kinds from different parts of the world to test out in the blight question. One kind from Manchuria is very blight-resistant. I find that our American chinquapin, both our eastern form and the western tree form are both blight-resistant. Also the alder-leaf chestnut. That is my experience. Those four chestnuts are practically immune, and on my property American chestnuts dying all around them.

I have one particular variety of American chestnut that I think a great deal of. It was one of the first trees to go down from the blight. Stump sprouts from this tree I have grafted on other stocks, on the common American, and recently on chinquapin. The sprayed ones are all alive; the unsprayed ones are not alive. Now, that is a matter of locality, perhaps.

The President: Dr. Morris, I detect a possible explanation for difference of results. Mr. Hunt's trees were sixteen or seventeen years old. Dr. Metcalf tells us, however, that young trees are relatively immune. How old are yours?

Dr. Morris: Not over twelve years. No grafts on them over four years. That would make a difference.

Mr. Littlepage: Well, Mr. Hunt did a good job of spraying. I saw his trees, and they were saturated.

Mr. Weber: Do they ever use a sticker in the Bordeaux?

A Member: What preparation of Bordeaux mixture do you use, Dr. Morris?

Dr. Morris: I use a commercial preparation called Pyrox.

Mr. Carl J. Poll: Will the chestnut blight attack any other trees besides the chestnut?

Dr. Metcalf: Outside of the chestnut genus, that is, the genus Castanea, the disease goes on to a few other trees A curious fact is that it will go on to the sweet gum, a tree not related at all, and it will go on to a few oaks, in no case enough to seriously damage them as it does the chestnuts, but enough so that those trees can easily be carriers of the disease.

THE PRESIDENT: I think we might pass from this funeral. We have a paper by Dr. Van Fleet, whose work, I suppose, is known to everybody here. The paper has been prepared by Dr. Van Fleet and will be read by the Secretary.

HYBRIDS AND OTHER NEW CHESTNUTS FOR BLIGHT DISTRICTS.

DR. WALTER VAN FLEET, WASHINGTON, D. C.

The sinister spread of chestnut blight, as the bark disease caused by the fungus *Endothia parasitica* is popularly called, within little more than 10 years, from its place of apparent origin near New York City into 13 states, practically reaching the eastern and northern limits of our native chestnut stands, and sparing in its course no individual trees exposed to infection, has about convinced even the most optimistic observers that without the intervention of natural checks the American chestnut as a forest asset will soon pass away. There is no present indication of diminution in the virulence of the fungus parasite and little reason to hope its progress as a timber destroyer can be stayed by any agency in the control of man. Already the losses, direct and indirect, occasioned by chestnut blight are computed as high as $50,000,000, about half of the estimated value of the entire stand.

With the very reasonable assumption that our native chestnut is doomed to virtual extinction it is well to consider in time if it can be replaced as a timber and nut-producing tree by other chestnut species or combinations of species less subject to injury by this disease-producing organism. The Endothia fungus, as a destructive parasite, is apparently confined to the chestnut, rarely if ever harmfully affecting genera even as closely allied as the oak (Quercus) or Castanopsis. Of the various species of chestnut or Castanea those native to Japan and Central China appear most resistant, probably having been for ages accustomed to the presence of the fungus, while the European chestnut, *Castanea sativa,* our native *C. Americana,* and our chinquapin, fall easy victims when exposed to infection. Of the Asiatic forms *Castanea crenata* of Japan and Eastern China and *C. molissima* of the interior are most promising in this respect, though the latter is still an almost unknown quantity as regards cultivation in this country.

Castanea crenata, commonly known as Japan chestnut, in its more typical forms is highly resistant, so seldom showing material injury that, for practical purposes, it may be regarded as immune. Japan chestnut seedlings raised from nuts grown in proximity to our native chestnut and exposed to the influence of its pollen are at times more seriously affected, but are rarely destroyed by the bark disease. The Japan chestnut is of comparatively low growth, of small value for timber purposes, but as a nut-producer is very fruitful and precocious, bearing great crops at an early age. The nuts are often very large but usually of poor quality. The species, however, proves quite plastic in the hands of the plant breeder, being readily modified in the directions most desired by the ordinary methods of cross-pollination and selection. It freely hybridizes with all other chestnut species and varieties that have been tried, and forms the basis of the most hopeful work in breeding for disease-resistance that has yet been attempted.

Castanea molissima is of much taller growth and bears nuts of moderate size, but of really good quality in the types that have reached this country. It can be infected by *Endothia parasitica* but the disease progresses slowly and in some instances results in little harm. The species has been so recently established in America that practically nothing is known of its breeding capabilities, but if its disease-resistance under our climatic conditions is assured it would appear most hopeful material for replacing our vanishing native species. Explorers report there is a still more promising chestnut in China, reaching nearly 100 feet in height under forest conditions, but it has not yet been secured for trial in this country.

Castania sativa, the commercial chestnut of Europe, in many varieties has long been cultivated in America and for nut production is without doubt the best of the well-known exotic species. It has no great timber value, however, and its disease-resistance, though higher than *C. Americana,* is scarcely great enough to warrant extended use as breeding material.

The native chinquapin, *Castanea pumila,* in its bush and tree forms remains as the only promising chestnut not found in the Orient. While readily inoculated by artificial means, the chinquapins, especially varieties of the northern bush forms, quite often escape natural infection, doubtless because of their small size, smooth bark, and less liability to insect attacks.

Chestnut breeding for nut improvement, chiefly by selection of native European and Japanese species, has been carried on in several diverse localities in the United States, with distinctly promising results but inter-pollinations have also been effected between most species and varieties, the outcome indicating that rapid improvement along the desired lines may be expected from crossing the really desirable types.

In 1903 and succeeding years the writer made many careful pollinations of the native chestnut and the bush chinquapin with European and Japanese chestnuts in many varieties. Some hundreds of seedlings resulted, mostly showing a high level of promise as judged by their initial thrift and vigor of growth, but the appearance in 1907 of the Endothia disease among the plantings soon put an end to the work with the native and European chestnuts, as, with scarcely an exception, they quickly became infected. The crosses of chinquapin and Japan chestnut, however, showed considerable resistance as a whole, and a number of individuals have resisted infection until the present time, though constantly exposed to the disease, both at their locality of origin in New Jersey and since at Arlington farm, to which they were transferred in the second and third years of growth. Others have been attacked in greater or less degree, but show great powers of recuperation, sending up suckers that often fruit well by the third year. The resistant varieties show great promise as nut producers, coming into bearing when three or four years old from seed and producing abundant crops of handsome nuts, of excellent quality, four to six times as large and heavy as those borne by the chinquapin parent, ripening in early September before chestnuts of any kind have appeared in the market. These nuts have thicker shells than other chestnuts, are much less subject to attacks of the chestnut weevil and preserve their fresh and inviting appearance longer when gathered. The flavor varies somewhat according to the particular pollen parent of the different varieties, but is always agreeable in the fresh state when the nuts are properly cured. When boiled or roasted they are particularly sweet and pleasant to the taste.

The trees are quite vigorous in growth, considering their rather dwarf type, reaching 10 or more feet in height at 6 to 8 years from the germination of the seeds and with scarcely an exception bear regular and increasing crops after the third year. Propagation of the most promising varieties has been effected by grafting and budding on *Castanea molissima* seedlings as resistant stocks, but it cannot be said that these processes, when performed under greenhouse conditions, give ideal unions. It is hoped to make fairly extensive trials of *C. molissima and C. crenata* as stocks for field grafting the coming season.

But the most encouraging feature of these chinquapin-crenata crosses is the excellence of their seedlings as grown from chance or self-pollinated nuts. Fifteen direct or second generation seedlings and one of the third generation have fruited to date. All have retained in growth and fruitage the characters of their immediate parent and it almost appears as if the good qualities of these hybrids may be perpetuated from seeds, thus dispensing in a great measure with vegetative propagation — always costly and uncertain with nut trees.

Several hundred of these seedlings are under observation and it scarcely appears too much to hope that they may inherit the disease-resisting character of their parents as well as other desirable qualities.

Selection work with a precocious strain of Japan chestnuts of apparently pure type has been continued through 4 generations of seedlings after an initial cross-pollination of two particularly desirable varieties had been made in 1903. These seedlings show greater range of variation than the hybrids with chinquapin, but all bear nuts of marketable value in 2 to 4 years from germination. None have been attacked by the Endothia fungus, though many have constantly been exposed to infection. Notwithstanding their extreme precocity trees of this Asiatic strain grow steadily and if thickly planted in favorable localities may in time produce timber of local value, but it is to the taller growing species of middle China that we must look for material to replace our vanishing native forest stands. The preservation in this country of the chestnut as a nut-bearing tree appears assured in view of the progress already made and it should not be too much to hope that resistant strains of the timber type may yet be developed by systematic breeding experiments.

The President: Inasmuch as the author of the paper is not present to answer questions, the only thing that may be done is to ask further contributions of knowledge in the same field. Has anyone any contribution to make?

Miss Louise Littlepage: I would like to ask how long the chestnut tree has been able to live with the blight?

Dr. Metcalf: Do you refer to the Asiatic ones or to the ones that grow here in America?

Miss Littlepage: The American.

Dr. Metcalf: It is almost impossible to answer that question because you have to define just what you mean by "living." If the chestnut tree is attacked first or early on the trunk, it is girdled and dies shortly, but if it is attacked first on the top there develop conditions like what is shown in this picture (showing photograph). I am not certain that you can see these bunches of suckers a little way up the tree. Now those trees will sometimes exist four or five years. I can say safely that I have seen trees last five years.

Dr. Morris: I can add three years to that.

The President: If there is no further discussion, we may adjourn.

Friday, September 8th, at 8.15 p. m.

Meeting called to order by the President.

The President: To my mind nut growing is part of a larger field, a field of conservation, one which is going to develop a whole new series of tree crops, of which the nuts are but a part.

PRESIDENT'S ADDRESS.

Dr. J. Russell Smith.

Agriculture is usually symbolized by a picture showing a man, a plow, and a sheaf of wheat. I would make the symbolization double by adding to it some kind of a nut tree in fruit. I have long had a vision of waving, sturdy, fruitful trees yielding nuts and other valuable fruit, and standing on our hilly and rocky land where now the gully and other signs of poverty, destruction and desolation gape at us. This vision of the fruitful tree also extends to the arid lands, there also vastly increasing our productive areas. Beyond a doubt the tree is the greatest engine of production nature has given us, and in its ability to yield harvests without soil injury on rough, rocky, and steep lands, and on arid lands, carries the possibility of the approximate doubling of the area of first-class cropping land in the United States, also probably in many other countries.

Twenty-one years ago this spring I began in a small way to bring into reality this vision of the tree-covered fruitful hills, although my interest in the matter goes back at least four years further to the time when I filled my pockets with the large grafted European chestnuts grown along his lanes by the late Edwin Satterthwaite, of Jenkintown, Pa.

My first essay at nut tree cropping was short but not sweet. I planted an acre and a half of Persian walnuts, seedlings being the only things then to be found. There being no one within my reach to guide me much, if any, I bought such seedlings as were to be had from a New Jersey nurseryman. I mulched them, and saw them each year grow less and less until the third season they disappeared. I have, however, some survival from this attempt in the form of black walnuts, which I had the foresight to plant as nuts immediately beside the Persian walnuts when they were planted as trees. Some of these walnuts are now quite sturdy young trees ready to be top-worked to some good strain.

My second attempt was the Paragon chestnut. In 1897 I started in on a 100-acre tract on the Blue Ridge Mountains, near Bluemont, Va., much of it too rocky for any cultivated crop, but admirably fitted to native chestnuts, and covered with a perfect stand. I had a good many acres well established, when, in 1908, the chestnut blight convinced me that further extension was perilous. My orchard has since been given over to the Department of Agriculture as the scene of their experiments in fighting the chestnut blight, but they have given it up, withdrawn their efforts, and half the orchard is now cut down and planted to Winesap and Grimes Golden Apples, which ten year's experience has shown me can be grown on such land without cultivation if mulched with the weeds and bushes that grow around them, and given some commercial fertilizer. I have a number of such young trees planted in 1907 in land of this character that are now full of fine quality fruit.

My third nut-growing attempt was with more select strains of seedling English walnuts than the miserable chancelings with which I began. One tree from the magnificent specimens at 3115 O street, N. W., Washington, D. C., and several from Pomeroy, promptly perished, apparently from winter-killing, and my nut hopes were at a very low ebb when the Northern Nut Growers' Association came upon my intellectual horizon. From it I have learned how to graft the walnut, the pecan and other hickories, and I have again started in on the English walnut, using the Mayette, Franquette, and several of the eastern seedlings. After the usual disastrous failures at top-working, I was this June in such a large condition of hope that I was in serious need of being hooped to keep myself down to normal size. Such artificial aids to the maintenance of normal size are, however, no longer necessary after this summer's experiences, during which the bud-worm has cut the ends of my Persian walnut shoots and the blight apparently has withered up my young grafts so that an 18 inch shoot of July 1st is now 17 inches black and 1 inch brownish green, and in other cases entirely dead. Alas what a slaughter! This apparently puts my Persian walnut hopes into a state of neutrality. I hope it is benevolent neutrality. So far as actual expecting is concerned, however, I am not doing any just now. I wait.

The grafted black walnuts, however, have met with none of these accidents, and these are a substantial and solid hope, as is the pecan, which is behaving handsomely on its own roots and also on the hickory roots.

Tree Crops Insurance.

As my experience with nut trees well shows, there is little doubt that we are now in a period of great activity of plant enemies. They are indeed a by-product of the splendid work now being done in bringing to us the crop plants of all parts of the world. Along with the Chinese and Japanese products which have already been so valuable and promise us so much more for American horticulture, we have received the San Jose scale, the chestnut blight, and probably others will follow. For the next twenty-five or fifty years while the nut industries are in what may be properly considered the experimental stage, I wish to urge the great necessity of some kind of crop insurance for the man who plants out any kind of nut tree. Say what you please, the nuts are not as well known and as reliable as the other fruits, such as the apple, and even apples are uncertain enough.

Crop Insurance Through Two-Story Farming.

By the term "crop insurance" I mean having something else on the same land that will make a profit year after year, whether the tree pays or not. If this is not feasible, there should be something else which can be quickly converted into a crop if the main hope suddenly disappears. For the man who is growing nuts on level, arable land. I believe I cannot emphasize too strongly the pastured pig. Pigs below trees (and nuts maybe above). This is merely the two-story farming that Europe was practising when Columbus was a boy. Upon all good nut growers I urge the pig for the first story. This unromantic but very practical aid to income for the nut-grower has had the great honor to be accepted by a president of the Northern Nut Growers' Association, Mr. Littlepage, and by a president of the National Nut Growers' Association, Colonel Van Duzee. Colonel Van Duzee, from the financial standpoint, really does not have to have his pecan trees either to live or bear. He is making money out of the oats, cowpeas, crimson clover, vetch, soy beans, velvet beans, and other forage crops which he is growing between the pecan trees, and which the pigs are harvesting for him and converting into salable products. Of course this makes the pecan trees grow like weeds, but I am now talking about the crop insurance aspect of it. This crop insurance aspect of Colonel Van Duzee's last planting cannot be too strongly emphasized. He has planted the trees 100 feet apart, practically four and one-quarter trees to the acre, and has then proceeded to the hog farming business as though the trees were not there. This may sound somewhat fantastic to the man of the North. Perhaps it sounds wellnigh criminal to the man who is trying to sell pecan tree land to schoolmarms, talking fifty pecan trees to the acre. When a tree has the habit of spreading two or three or four feet per year when well fed, and keeping it up an indefinite time, the question of ultimate size is one to be reckoned with. That the pecan tree can attain great size in the North, as well as in the South, is attested by the record of a tree in northern Maryland on Spesutia Island, near the head of Chesapeake Bay. The tree is described by one of our members, Mr. Wilmer P. Hoopes, as being eighty-four years old, hale and hearty.

"This tree is 106 feet tall, with a spread of 110 feet, has two limbs, respectively 57 and 60 feet long and is 13 feet in circumference, 3 feet above ground, and is an annual bearer of thin shell. nuts that, though rather small now, are mighty good to eat."

If nut trees are going to grow into that size, we must plant very wide or make up our minds to a very heroic and very difficult act, one which many men in the South should do this minute, namely, cut down half or three-quarters of the nut trees on a given acre.

I wish to emphasize the health aspect from the standpoint of the tree of this very wide planting. It is generally recognized by horticultural authority that trees develop sickness and disease when crowded in large numbers. The pecan trees 100 feet apart may perhaps escape this danger and have the sun on all parts of their leaf surface, a fact, by the way, which is necessary to crop production on this and other nut trees.

This wide planting is practically the method followed in most of the important French Persian walnut districts. With very few exceptions their trees are isolated, a man having two or twenty, or thirty, scattered about his farm, usually in the midst of his fields where they can develop to perfection, take the tillage of the crops, and bring in some extra money, which one of the owners very significantly told me is "income without effort." This income without effort aspect of the matter takes the form of a man having to pay as much rent for a good walnut tree in the department of Dordogne, as he does for an acre of good wheat land alongside.

Rough Land Tree Crops Insurance.

What kind of tree crops insurance might I have had for my chestnuts grafted nineteen years ago? Had I known then as much as I now know about nut trees, excepting the chestnut blight, I should have planted that place thickly with black walnut nuts and northern pecan nuts, unless the squirrels were too quick for me, in which case I should have used little seedlings. These I would have kept in a submerged but hopeful condition by occasionally cutting them down. This would keep them from crowding the chestnut trees, but would by no means have kept me out of a stand of vigorous pecans and black walnuts ready to graft at very short notice. When the blight blew its signal of national alarm in 1908, I could have gone to grafting those trees and they would by this time probably have been in bearing and ready to replace the chestnuts which are now dying with the blight.

If any one wishes to contradict my statement about these trees living with such treatment, I will admit that I am not speaking from experience with regard to the pecan, but I believe the experience of others admirably verifies the statement I have made. I am, however, speaking literally from my own experience when I refer to the black walnut. For ten summers past I have in July and August scythed off a certain tract of stump land planted to apples. Each year black walnuts and butter nuts have been cut, and now at the end of that time the stubs are still annually throwing up vigorous shoots 2½ to 4 feet in length, and if they are allowed to escape for a season, they dart past a man's head so fast he wonders what has happened.

While I hope to experiment for forty more years on my mountain side in the attempt to cover it with waving fruitful trees that are so immune to pests as not to need spraying, I shall never again be caught with only one possibility upon a given piece of land. If I should top-work my native hickories to shag-bark, which I know involves considerable waiting and considerable uncertainty, I can, with very little expense, put upon the same ground a full stand of grafted black walnuts and a full stand of budded pecans, or if I do not care to go to that much trouble, I can graft my hickories and plant my native black walnuts and merely keep them there in submerged condition as reserve trees ready to be grafted at any time. For a pecan orchard I can do exactly the same thing, using black walnuts as fillers, possible successors, or as ungrafted reserves. For the Persian walnut, the black walnut can again come in as a filler or as a reserve, and for grafted blacks of any variety, other blacks can be kept waiting for the arrival of possible better varieties which could easily become the head of the corner.

My experience with transplanting seedling pecans shows that they, too, can, without serious difficulty, be planted out in such rough land and kept waiting there for years until the day of possible utilization.

Lastly, I wish to emphasize one more possible crop insurance tree for the man who is planting nuts on land difficult of cultivation, or entirely untillable, and that is the persimmon. I have paid my respects above to the tilled crops and the pastured pig for the arable land, and for the unarable land I would still emphasize the pig and give him other sources of food to supplement pasture. Among these possible foods is the persimmon which as yet has been little appreciated in an extensive way, although hundreds of thousands of men know it is highly prized forage and of considerable fattening value. It has a crop insurance virtue, however, other than its acceptability as pig feed. That is the hardiness of the tree and the ease of establishing it. In my pasture lot the Angora goat, even when pushed with hunger, has not touched persimmon wood or leaves. The same is practically true of the black walnut and of the butternut. This fact is one of great importance, because it means that we can keep rough land in pastures, even goat pasture, during the period when we are planting out tall-headed nut trees of almost any variety, and at the same time have a perfect stand of two kinds of crop insurance trees coming along, namely, walnuts and persimmons.

In this connection it is desirable to point out the relation of this recommendation to the actual practice in nut growing regions of Europe. They do not plant a little two or three foot tree. They plant an eight or nine-foot tree often so slight it can not hold itself up, and is kept in place by one or two stiff poles. This tall-headed fellow stands out in the middle of the wheat field, the vineyard, the hay field, the goat pasture, the cow pasture, with its head entirely out of reach of the pasturing animal, its trunk protected by one or two stout sticks, and in due time it takes hold. With the trees properly developed in the nursery, I know of no reason why the same practice cannot prevail here, and I have at least one Busseron pecan tree that has gone safely through the first summer of it.

The practice of one pecan grower in Texas, reported in the Nut Journal, is suggestive of a crop insurance practice capable of wide use in the North, namely, planting of filler trees of quick-yielding varieties. There is no reason why the northern nut trees might not be planted 40, 60, or 80 feet apart in peach or even apple orchards, as did the Texas man with his nut trees 72 feet apart, occupying every fourth place in an 18-foot spaced fig orchard. I would call attention of Northerners, however, to the desirability of the mulberry, the most rapid growing and cheapest of all our fruit trees, doing well in Carolina at a space of 30 feet, which would enable the Northerner, by a little variation of the interval between his mulberry trees, to plant nut trees anywhere from 60 to 100 feet apart.

Sod Mulch Nut Orchards.

I know that any suggestions of the production of trees without plowing is unorthodox, and therefore not likely to be heard straight, and particularly perilous in the presence of professional horticulturists in state or national employ. To such I wish to call attention to the fact that I have emphasized in this matter, first, the tillage methods, and that I am making no knock against cultivation. We all know that it works under some conditions, and we all also know that there are some conditions in which it will not work. If I lived on level, sandy loam, I'd be a furious tiller of tree crops fifteen times a year. But I was born upon a rocky hill, and now I live upon another that is higher and rockier, and I don't believe in tilling it fifteen times a year. Must I abandon it, or adopt uses to its conditions? Out of these conditions mulch orcharding has come. Despite the orthodox, I know that the growing of same kinds of fruit trees without cultivation has passed the experimental stage. At this moment millions of barrels of apples are approaching perfection in orchards in Virginia and other eastern states that have not been plowed for more than one, and sometimes for more than five seasons. The application of this method to nut trees is still in the embryonic stage, with theoretic factors favoring it.

I do not know how far the mulch-fertilizer method can go, but I am sure it may go much farther than most professional horticulturists will admit. I find that the pecan tree starts off nicely under the mulch fertilizer conditions of the apple. The walnut tree has certainly done it for ages with less aid, and I believe it is up to us to find methods of handling land and trees and moisture which will enable us to avoid the danger, costs, and difficulties of plowing rough land and still get good trees. For example, the absence of cultivation does not necessarily imply the absence of fertilizer. The way a few black walnut trees in my apple orchard have snapped their buds and grown in response to the nitrate of soda that has been put upon the apple trees beside has been little short of astounding. The way a poor little starveling persimmon wakes up when the same treatment comes along, is equally interesting. I cannot speak definitely yet about the influence of fertilizer on the Persian walnut or the pecan.

In connection with the fertilization matter, it is well known that a crop of clover or other legumes is very important as a part of the rotation of crops in plow agriculture. Similarly I expect great value can be obtained in our pastured and fertilized nut orchards if we so treat the soil with lime, phosphorous, and whatever else is needed, to give a good mat of white clover and other legumes which are undoubtedly a good nitrogen supply for trees whose roots interlace with theirs.

Similarly I see great possibilities in the interplanting of some leguminous crop tree such as the honey locust or the Kentucky coffee bean in our nut orchards. It is true neither of these trees has yet been selected and developed to the crop point, but they are much more promising than Sargent says the wild Persian walnut was at its beginning. It is an established fact that a non-leguminous plant can take nourishment from the nitrate-bearing nodules on the roots of adjacent living legumes, to say nothing of its well-known ability to feed upon the nitrate collections of legumes that have lived in past seasons within reach of its roots. Thus the interplanting of a legume and a nut tree seems to promise a continuous supply of the all-important nitrates for the nut tree.

The Question of Moisture.

It is not necessarily true that a tree gets a low percentage of the local rainfall because it is not plowed. The last palliation, or is it provocation, that I would throw into the camp of the orthodox and the worshippers of the plow, is the water-pocket, or small field reservoir, draining a few square rods and holding hard by the roots of a tree a few gallons or a few barrels of water which would otherwise run away. I showed this association a number of photographs of these water-pockets last year. Their most extensive American user, Dr. Mayer, considers them successful from the trees standpoint and profitable from the economic standpoint. Since the great virtue of cultivation is the conservation of moisture, I will submit that this device, worked out and used for three centuries by the olive growers of Tunis, for twenty years by Dr. Mayer, of Pennsylvania, and about the same length of time by Colonel Freeman Thorpe, Minnesota, can from the point of theory and perhaps also from the point of practice, equal tillage on some soils, and with less labor and much greater economy in farm management, for the making of water pots is a job for odd times, the bane of agriculture, and tillage all comes in a pile — another bane of agriculture.

Upon the whole, I think my 21 years of nut loving have run me directly and indirectly into ten thousand hard earned, and as yet, partly not earned dollars. Rather a deep sting for a pedagogue. When the last of my grafted chestnut trees come down next year, I will have little to show for that ten thousand, but an experimental nursery and some experimental trees scattered about the hillside. But the experiments are still interesting. I still have hope, and I still love trees. I am still ahead.

The President: I believe every other man here today has defended his thesis. I will not claim any exemption.

Dr. Stabler: The President has mentioned the combination of apple and walnut trees. I would like to ask him if he has seen any deleterious effects upon the apple from the proximity of walnut roots. Now, some of my friends in Montgomery county have the idea that an apple tree will not live within fifty feet of a walnut tree. I have, myself, seen a number of apple trees die, apparently because they were neighbors of walnut trees. I wasn't sure that that was the cause of death, but they died, and walnut trees situated in an apple orchard will have a ring of dead apple trees around them. Now that is one case that I know of where the walnut tree acts injuriously upon the vegetation to which it is neighbor. All of the farm crops, wheat, corn, grass, and oats, and rye, etc., seem to thrive just as well under the limbs of a black walnut as they do away from it. In fact, frequently you see the grass greener and more luxuriant right up to the trunk of the tree than anywhere else, but it doesn't seem to be true of the apple. Now, I would like to hear from the President.

The President: I simply made that as a suggestion and referred to this instance as an illustration of the effect of fertilization on the walnut.

Dr. Augustus Stabler: Well, how are those apple trees doing?

The President: I had enough trouble without looking for more by mixing walnut and apple trees. The walnut trees are small, merely the growth from stubs repeatedly cut.

The next on our program is a paper by Mr. McMurran, of the Department of Agriculture, upon the question of diseases of the English walnut. Mr. McMurran.

Mr. S. M. McMurran: I am sorry that in this, my first appearance before this Association I haven't a more optimistic and encouraging subject to talk on than diseases. You men and women who are burdened with establishing this industry have enough on you without contending with diseases, and it was not my intention to talk upon diseases at this meeting, but Mr. Littlepage, Mr. C. A. Reed, and Mr. Jones, and several others, have been urging the matter strongly, which explains my appearance at this time.

Walnut blight is a very common and serious disease on the Pacific Coast. It may be a native disease, though it has never been reported on native black walnuts, and it has proved a very serious menace to the seedling English walnut groves on the Pacific Coast.

This little piece of work I want to tell you about tonight was done through the co-operation of Mr. Jones and Mr. Rush, at Lancaster, Pa., and has just been completed within the last few days.

I made a trip through New Jersey, Delaware, and Pennsylvania, about the first of August, and found a number of nuts that had all the appearance of being infected with the walnut blight germ. They had the same appearance as those nuts that you saw this afternoon in Georgetown. I brought them back here and made cultures from them in the laboratory, and after that the problem was absurdly easy. The germ was obtained without difficulty, I obtained a pure culture, and then I went up to Mr. Rush's place, at Lancaster, and made a number of inoculations, of which these few I have here are typical. This nut that you see here was inoculated from a pure culture along with a number of others, and the condition is as you see it, after about a month. Inoculations were also made into twigs, and I will pass these around for your examination.

The one marked, inoculated, has a little canker on it, and on the other you will have difficulty in finding the needle punctures, but you will see them if you look closely.

Now, I hardly know what to say about this disease at this time. As I have stated before, my work has been in the South for the past several years, and no work has been done on this disease in the East prior to this summer. That it must have been here for a long time seems almost a foregone conclusion, because of its wide distribution. Mr. Jones was a little bit conscience-stricken for fear he brought it here with him. Still it is in Delaware and Maryland as well as Pennsylvania, and you can't blame Mr. Jones for that. I think, too, it is less actively pathogenic than on the Pacific Coast, or we would have heard of it before. That it should prove a serious menace to the development of the walnut industry in the East, is too much to assume at this time. It will undoubtedly eliminate a number of the varieties that are considered promising now, but the course that will have to be taken will be to propagate only varieties which are highly resistant or totally immune to the disease. Just what these varieties are going to be in the East we do not know as yet, of course. We should avoid the mistakes that the growers on the Pacific Coast have made of planting seedling trees, and taking the chance of their being resistant to the disease. A great many varieties will be automatically eliminated when the nurserymen bear in mind that this disease is one to be considered, and I want to say, that, in addition to this, the Department will take pleasure in making artificial inoculations and tests on all those concerning which there is any question. We have the germ in culture now and will maintain it, and anyone who discovers a new variety, or has an old one they would like to propagate, can communicate with us, and we will take pleasure in testing its susceptibility.

I think that is about all that can be said on the subject at this time.

This disease has been studied very carefully on the Pacific Coast and a number of publications issued from the California Experiment Station concerning it.

For those who are interested in looking the literature up, I have here the following references: Cal. Station Bulletins, 184, 203, 218, 231, and Circulars 107 and 131.

A MEMBER: Is spraying of any avail?

MR. MCMURRAN: It has helped somewhat, but it has not proved economical on the coast.

A MEMBER: In order to have that test made, would it be necessary to send the things to the Department?

MR. MCMURRAN: No; it would be necessary for me to come to you and test them on the trees.

MR. LITTLEPAGE: Did those walnuts in Mr. Brown's yard look to you as though they had the blight?

MR. MCMURRAN: Yes, they looked like this (showing specimen).

MR. LITTLEPAGE: Did you notice that tree just across the fence? The reason I ask the question is that if that is blight out there, then that tree right across the fence is very likely resistant, because I have noticed that those walnuts have had this on and off for six or seven years. The limbs of the two trees are within twenty feet of each other.

MR. MCMURRAN: Well, that is a very encouraging point.

MR. LITTLEPAGE: I didn't think that was blight. All those trees at Georgetown that I have observed have that condition on them, more or less, except that one tree.

MR. MCMURRAN: Yet, isn't it true that they bore pretty good crops of nuts, nevertheless?

MR. LITTLEPAGE: Oh, yes.

MR. MCMURRAN: Well, that was the point I had in mind. Of the two trees one bears every other year, and the other bears heavy crops every year.

DR. MORRIS: You see the same thing at the Experiment Station in southern California. One tree will be absolutely resistant to blight; the other will be all killed. And down at Whittier, perhaps, seven-tenths of all the trees will be badly affected with the bacteriosis, and the others not very much affected, so that, apparently, it is largely a matter of this cynips, which introduces the bacteria, selecting certain trees. Certain walnuts are very much affected, and the involucre looks very much like that of these nuts (showing specimens), but, on examining them, I found a very large number of small larvae beneath the involucre. I sent some of them to the Connecticut Experiment Station and some to Washington, but they didn't tell me what they were. Those same larvae I found in one black walnut on my place, which is very heavily infested with them. Most of the nuts drop because of the injury to the involucre. I haven't determined the species yet. I don't know whether the larvae come first and the bacteriosis second, or whether it's the other way around.

THE PRESIDENT: Are there other persons who wish to give themselves a chance of asking Mr. McMurran a question? I have a question that is troubling me. Perhaps the house can throw light upon it. I had a number of Persian walnuts, Vrooman Franquette and Mayette, grafted on black, and by the Fourth of July they were growing nicely, with tops all the way from four to twenty-four inches long, and then the tip got black and the blackness went down. I sent a sample to Mr. McMurran. The leaves first died and then the twigs.

MR. MCMURRAN: I received that, but it was so dried when I got it it was impossible to make anything out of it. I have seen the same thing on pecans, only in those cases the leaves just got black and fell off, and we never have been able to assign a reason for it.

THE PRESIDENT: Am I the only man that has had that experience?

A MEMBER: I had this year the same thing on the Vrooman Franquette, but it recovered and has made excellent growth since.

MR. MCMURRAN: Have yours subsequently lived?

THE PRESIDENT: No, they subsequently died. (Laughter.)

MR. J. F. JONES: I had that experience this summer. The new growth was very tender and took blight very readily.

THE PRESIDENT: Well, this doesn't appear to be blight.

Mr. Jones: If the English walnut starts late and the tender growth comes in the hot weather, the sun will kill it.

The President: You have described my conditions. These are late grafts. Have you had that same experience with late grafts and not with early ones?

Mr. Jones: Yes, sir. The blight will show itself in the specks on the twig.

The President: Well, do you mean on this sunburn?

Mr. Jones: No, sir.

The President: There were no specks in this case.

Has any other member any question on the blight? I want to call attention to the fact that we have here in this room tonight nearly every one who is studying the question in the eastern United States.

Mr. McMurran: Mr. President, I would like to say that we would like to get all the information we can on it.

A Member: According to my observation, the blight is not going to do much to the tree, because the tree here makes its growth and hardens up before the blight comes. The blight, you see, must have moisture and heat to work, but it comes in just right to catch the nuts.

Mr. R. L. McCoy: Mr. President, some mighty strange things happen with grafted and budded English walnuts, and I believe I could ask questions that would puzzle a school of wise men. Now, none of the answers here will stand up very well. For instance, Mr. Jones says this dieing back is due to late grafting. Well, I had some Holdens that we budded this last June a year ago, that suddenly, all at once, along in July this year, proceeded to quit business, and quit clear down, and the root died, too, the black walnut root. It is a serious question in my mind whether the black is the best stock to be used or not. Mr. Jones and Mr. Reed have good success grafting the English on the black. We don't down our way. Both of those men are in regions where the land is inclined to be alkali. The land where my orchard is, and where Mr. Littlepage's and Mr. Wilkinson's orchards are, is inclined to be acid. I am of the opinion that, to make a success of the English walnut, we are going to have to use lime, and use it extensively, not only in the nursery, but until the time when the trees begin to bear.

The President: It is one of the common pieces of knowledge of all the agriculturists of France that the walnut does well on lime soils, and they don't expect it to do well on acid soils.

Mr. Jones: Mr. President, I think, if Mr. McCoy will examine his trees, he will find that the root dies first.

Mr. McCoy: Well, why should they rot?

Mr. Jones: That is like a good many other things, Mr. McCoy. We don't know why.

Mr. Littlepage: A pecan topworked on a water hickory will sometimes kill the whole tree, top and all. It is the top that does it.

Mr. M. P. Reed: This year we made some observations of different varieties, as to time of leafing out, and we found the Eastern varieties leafed out about the first of April, and the Franquette and Mayette about the fifth of May, and one variety we got from the Department, No. 39,884, didn't leaf out until the twenty-fifth of May. That seemed to indicate that the French varieties were going to prove better than the Eastern varieties, because late frosts cannot hurt the blossoms.

Mr. Littlepage: That is correct. I watched them this spring at Mr. McCoy's. Franquette and Mayette, over there and with us, were anywhere from ten days to two weeks later leafing out. Some of the buds were entirely dormant and some just bursting when many of our Eastern varieties were in full leaf. But my experience here in Maryland on walnut trees from all sections was that every one winter-killed except one Nebo tree and a top-worked Potomac. I have a Potomac which has made ten to twelve feet of growth, and it didn't winter-kill the slightest, and my Nebo tree hasn't winter-killed any, but the Franquette, the Meylan, the Rush, the Holden, and several others winter-killed very badly. At least, Mr. McMurran said that was what it was, and I thought it was, too.

The President: Well, Mr. Littlepage, isn't "winter-killing" rather a relative term, dependent partly upon the climate and partly upon the condition of the tree at the end of the growing season? Was there anything back of your statement, any late growing, or something of that sort?

Mr. Littlepage: Well, they didn't grow any later than the Potomac grew, but that tree was top-worked about five or six feet above the ground and I think that makes them hardier.

A Member: Were the winter-killed trees cultivated late?

MR. LITTLEPAGE: Yes; and fertilized heavily.

THE PRESIDENT: Haven't you answered your own question?

MR. LITTLEPAGE: Well, I won't grow trees if they do not grow better than that.

MR. MCCOY: Mr. Littlepage may think he has answered this question, and these other gentlemen may think they have answered it in a different way, but there are some rather peculiar phenomena there. I don't question the sincerity of these gentlemen, but I don't think they have answered the question. Whenever you transplant these trees and whenever you get to growing them in big quantities, you will have certain peculiar phenomena that you are not certain at first as to just what is the cause. Mr. White is just as near right when he says they kill in July as Mr. Littlepage when he says they winter-kill in December. And I will just say to people who buy walnut trees from our firm that when they transplant them under the same conditions as Mr. Littlepage, they may expect similar results.

MR. LITTLEPAGE: I have never seen a northern pecan winter-kill.

MR. MCCOY: Oh, I have.

MR. MCMURRAN: Mr. President, this term "winter-killing" is a little bit misleading, and it has been a matter of discussion in the National Nut Growers' Association for several years and a great loss to many Southern pecan growers. A very common statement that one hears down there is "Why, our trees don't winter-kill. We don't have cold severe enough to kill them." But they do. It isn't a question of severity of cold, but suddenness of change. For instance, in southern Georgia one year, we had a rainy period in October; about November 20th there was a hard freeze. A number of orchards which had been fertilized late in the fall were almost wiped out. If it were not due to the fact that the term is too long, and we could say "damage due to sudden temperature change," it would convey the idea exactly. I saw trees injured in the fall of 1914 that didn't die until September of the following year, and I have a number of photographs in my office.

DR. STABLER: I believe, Mr. President, that the stimulation of growth late in the season has a great deal to do with the winter-killing of trees and other plants. I have noticed it in clover and alfalfa, and I have noticed it in peach trees.

THE PRESIDENT: I think Dr. Stabler has stated a very well-known principle, not only of horticulture, but also of agriculture. Last year we questioned Mr. W. C. Reed as to the condition of a certain top-worked, heavily forced, black-walnut we had seen the year before at Vincennes. We were confirmed in our belief that the tree was dead, but that another tree budded at the same time with the same bud-wood and not forced, lived. We had a dry summer that year, a wet fall, twenty degrees below zero at Christmas, dead apple trees. I suspect that Mr. Littlepage has a problem in the balance of tillage and top-working.

DR. STABLER: I think if he visits his neighbor, Professor Waite, he will find out how to manage trees so they won't winter-kill, because he knows how to fix it. (Laughter.)

MR. LITTLEPAGE: I treated the trees just like the pecan. I have never seen it possible yet to over-stimulate a pecan and winter-kill it. I don't say it isn't possible, but I have never seen it.

THE PRESIDENT: I can show you a few.

MR. M. P. REED: Mr. President, we have that condition in the nursery row.

MR. LITTLEPAGE: Well, those are grafted, are they not?

MR. M. P. REED: Grafts and buds, both.

DR. MORRIS: In regard to the grafting of the Persian walnut upon black walnut stock. In Connecticut, we have three species of mice — the common field mouse, the pine mouse, and the white-footed mouse. These mice all follow in the holes of the moles, and they are very fond of the bark of the Persian walnut, and will destroy a good many of them. Now, with the black walnut, on the other hand, when one of these mice comes along and takes a bite of that, he shuts one eye, cleans his teeth, and then goes on to something else. (Laughter.)

Now, in our country the soil is practically all acid. The black walnut will grow in pretty acid soil. The Persian walnut almost demands a neutral or alkaline soil. So, for Connecticut there is no doubt that we really need the black walnut stock for the Persian walnut.

THE PRESIDENT: Any further problems that are vexing the orchardist with regard to the Persian walnut? If not, I think this is a suitable time to bury it until next year. Col. Van Duzee, a man who has had more experience with the pecan than almost any one else in the room, has kindly consented to make his contribution at this time. Col. Van Duzee.

Col. Van Duzee: There is a longing on the part of a large percentage of men and women that I meet to escape from conditions which do not seem to be especially favorable in the large cities, and to get away into the safety of the country. I believe that nut tree growing offers one of the safest of those outlets. I believe that a nut orchard should be a part of a general farming operation. I want to give you my ideas about inter-crops. Fifteen years ago the doctors gave me three months to live, drove me out of my business, and away from my home to prolong the agony for a few weeks or months, and I found, among my orchard trees, a reasonable amount of health which, to me, repays a greater value than I could reckon in dollars and cents. It has given me the privilege and the opportunity of removing myself from the turmoil of the city and the conflict of the business world to a peaceful, quiet existence, that, to me, is very much more satisfactory. Now, that is an inter-crop.

Down in Florida, when we used to get together in our citrus seminars and in our horticultural and agricultural meetings we used to try and make a man say on what class of soil his home or orchard was located, so that we might get his viewpoint. For the successful nut orchardist, in a small way, must, of necessity, be a successful agriculturist. He must understand soils. You can't have successful inter-cropping without understanding soils, and, therefore, I can't tell you definitely what would be good for your northern soils. But I can tell you this, that the first thing to do when you have an orchard problem to consider is to make an exhaustive survey of the character of the soil. If it is a fresh, recently cleared piece of fertile soil, under favorable conditions, I am satisfied you don't need very much in the way of inter-cropping. On the other hand, if you select for your orchard site a piece of land that has been worked to death, I believe it would be well to inaugurate a system of inter-cropping that would have for its object the building up of that soil and the improvement of the environment for the roots of those trees. In the South, we are favored with twelve months of growing weather. We plant our crops throughout the year. I am just about beginning now to plow for my oat planting. I am going to pasture those oats all winter with hogs and cattle. We will harvest our oats in May. We then follow them with a legume which will restore the fertility to that soil.

In the present condition of the market for commercial fertilizers, I believe we have gone beyond the point where any man can afford to use commercial fertilizers to any great extent on ordinary crops. I believe it is possible to go too far in the stimulation of a growing orchard. My opinion is that a series of inter-crops that results eventually in a large deposit of nitrogen, such as we get from several leguminous crops plowed under, will have a tendency to bring that orchard into a condition — I am speaking now, you understand, of the pecan — where it will be susceptible to disease and winter-killing.

If you have followed me as far as I have gone in this, you will begin to see at once that the men who are going to be successful in solving these problems are the men who are going to learn the game. Among the human family, you know, we have a stock phrase that we use sometimes when a man dies and we don't understand the cause of his death. We say "He died of heart failure." That is a convenient thing to hide behind. "Winter-killing," to my mind, is another such term. It is used, for instance, in a case where an individual tree, for some reason or other not quite understood, "passed away." (Laughter.)

I have been fifteen years in the growing of pecan trees in the South, and I am free to confess that the most disturbing element in my life at the present time is the fact that we "have known so many things that weren't true." We have gone ahead fully believing that our course was justified, that it was well digested, desirable in every way, and suddenly waked up to find that we were radically wrong, or, at least, that there was a very open question as to whether we were not absolutely wrong.

To the person of limited means the idea of being able to produce a nut orchard at very little expense is very attractive, and my heart goes out to people in that condition because I have been in that condition myself and passed through it. Ten years ago I bought a piece of land for forty dollars an acre, and planted seventeen pecan trees on each acre. It cost me twenty-five dollars an acre to lay off the land, dig the holes, and plant the trees nicely, with about a half pound of bone meal mixed in the soil in each hole. I carried that nut orchard on, using some inter-crops, up to one year ago, when it finished its eighth year of growth, and, without burdening you with the minute figures, I am going to say we have sixty-five dollars charged up to it, and it will take $185 more. Now, there is $250, if I haven't made any mistake. I planted among those trees nursery stock, and I sold off, during the time that those trees were growing, nursery stock to the value of, we will say, $250, making my inter-crops pay the expense of cultivation and interest on the investment up to that time. So don't forget that. Now, this is a case where we are going to balance our books, as every business man does, and every farmer ought to. I have, up to the time those trees were eight years of age, invested approximately $250, and have received back not only that, but the interest on the investment. So, at eight years of age the orchard cost me nothing. Now, that would be the way a great many people would figure that proposition. I can't do it that way. I am going to charge that orchard with $250 an acre for supervision. Now, above that line (indicating on blackboard) it looks as though that orchard had been built up for nothing, and below the line you see a debit of $250 charged against that orchard. There is not one man in a hundred that contemplates a proposition of this kind that is willing to charge his orchard up with the gray matter that he puts into it. But there was an intercrop in that orchard, of health and satisfaction, which is worth more to me than my services, so I will put that in here as $250. (Laughter and applause.) Now, I walked across this morning — I like to walk, and I came across the park. I saw a monument right over here in a little iron circular enclosure, erected in honor of Andrew Jackson Donald, a man who died several years ago, the man who was partly responsible for the magnificent landscape gardening effect of which this building is a part. It said on the monument this: ''His life was devoted to the improvement of the national taste in rural art.'' Down below it said: ''His mind was singularly just, penetrating and original.'' Any man ought to be proud to have that sort of thing engraved upon his monument, and, gentlemen, any man who will go out and plant nut trees like those you saw this afternoon, ought to have a monument under those trees expressing sentiments similar to these, because he has done something which remains after him, and it is one of the most worthwhile things that any human being can do. That is one of the other valuable things about a nut orchard.

Now, this nut orchard — this is no myth — this is a practical proposition. I was practically bankrupt when I went there. It is paying now in a small way, and will pay more later on, and I am going to leave it to my children as one of the safest and sanest investments that I could leave them, and I want to say, ladies and gentlemen, that the consciousness of possessing something of that sort, which can't be stolen, can't run away, is another inter-crop that is grown among those trees.

I sometimes tell a story of a little two-horse farm down in the South. I drove fourteen miles out into the wilderness to find some seed nuts to plant this nursery with years ago. I found there an old home which was the central home of a large plantation in days gone by, and there were half a dozen — perhaps seven or eight — magnificent, great pecan trees about the lot, and a vegetable garden at the back of the home. Those trees were loaded with nuts. There was a young man there — one of the most pitiful things that I ever saw in my life — a fine young man — magnificent character, and recently married, making his home in this old tumble-down house, making his start in the world there. He didn't own this land — rented this fifty or sixty acres of open land, and these trees went with the two-horse farm. I said, "My friend, you must receive quite a little income from those nuts." "Yes," he said, "I sell the nuts from those trees every year, for more money than I make from the two-horse farm."

I heard of another case down in north Florida where two girls were left absolutely dependent upon their own exertions, and they were girls who had been reared, as some of the Southern ladies have been reared, to be dependent on others. They didn't know how to go and fight the world for a place. They were a little too far along, perhaps, to take up that sort of battle. There were two pecan trees in front of that old homestead, and the old homestead was all that was left of the family fortune. It was furnished, had a cow in the back yard, and a garden, and a few Scuppernong grape vines. These two pecan trees in the front yard gave those two women approximately three hundred dollars worth of nuts per annum. They were magnificent, great, big pecan trees, and they lived from them the balance of their lives practically, with the help of the other things I have mentioned.

Inter-crops are nothing more nor less than the evidences of the master mind directing the problem of handling the soil in which the orchard is growing. Now, just simply go right down deep under everything, pay absolutely no attention to the wonderful stories that the promoters tell you (laughter), keep your money, save it, use it, and spend it — yes, but recognize this one thing, that the most important element in success in the small orchard, as part of the rural or suburban home, is a knowledge of agriculture and horticulture. It is one of the most fascinating studies in the world, and I have no doubt but what you will find that you can go right along inter-cropping with vegetables and other crops, bush fruits strawberries, and all those things for the first few years after you plant your nut trees, and even if they all die you will have been able to break even on the commercial side of the proposition, and then you will have the additional years of experience, which no nut orchardist can dispense with. You can't buy it with money or get it out of books. You have got to dig it out of the ground yourself. (Applause.)

THE PRESIDENT: I am going to take the liberty of emphasizing one point the Colonel made. He told you about the great number of things they knew down South that were not so. I wish to give some geographical spread to his generalities. We are in the same condition in the North. If you will stop and look clear through an agricultural idea, you will be astonished, ladies and gentlemen, absolutely astonished, to see how, mostly, we don't know it. The other day I happened to be walking through an apple orchard with the official horticulturist, and in response to some remark he made I asked: "Do you know that, or do you think it?" "Has that been experimentally proven?" He answered: "No, it has not." Most of the things we read in the books and hear in this place and other places we don't know. We think we know, but when we come to a show-down we really haven't got experimental data. I know of no people to whom that thing needs to be emphasized more than to the Northern Nut Growers' Association.

SATURDAY, SEPTEMBER 9TH, AT 10.30 A. M.

Meeting called to order by the President.

THE PRESIDENT: The first order of business, I believe, will be the report of the Nominating Committee.

THE SECRETARY: The report of the Nominating Committee is the following: For President, W. C. Reed, Vincennes, Indiana; Vice-President, W. N. Hutt, Raleigh, North Carolina; Secretary-Treasurer, Dr. W. C. Deming, Georgetown, Connecticut.

Mr. Littlepage: Mr. President, I move that the report of this Nominating Committee be accepted and adopted, and these officers declared elected.

The President: Do I hear a second?

A Member: Second the motion.

The President: The nomination of this list is moved and seconded. Is there any discussion? If not, all those in favor will say "aye;" opposed, like sign, it is carried, and they are elected.

Mr. Littlepage: While I am on the floor, I want to read a resolution which I have drafted, and I will read the clauses separately:

"Owing to the fatal character, the unchecked and rapid spread of the chestnut blight," is there any question about that? If that is not true, let somebody hold up his hand.

"Owing to the fact that it has been widely disseminated through the shipment of nursery stock;" is that correct?

"Owing to the fact that in the first stages the disease cannot be easily detected;" is that true?

"Owing to the fact that the young trees apparently have a temporary immunity from the disease;"

"Therefore, the Northern Nut Growers' Association believes that the continued free shipment of chestnut nursery stock will be productive of endless destruction of property in those places where the chestnut trees haven't yet the disease." If that is unsound, why, somebody say so.

"Therefore, be it resolved, that we, the Northen Nut Growers' Association, suggest that the Secretary of Agriculture prohibit the shipment of chestnut nursery stock, except in the localities known to have the blight, and that with each permit for shipment shall go a bulletin or circular giving the important facts about the chestnut blight. The only exception to this regulation shall be the shipments for experimental purposes, and such shipments must have the above mentioned permit, and the name of the nursery from which such trees have come, and must be inspected by Federal inspectors." I assume, of course, that inspection is a general inspection. I don't mean each particular shipment. If there are any questions about that, why, I will let the chair answer them.

Dr. Ulman: Mr. Littlepage, I would like to ask a question, or, rather, offer a criticism. If I understand you rightly, you say, "except in the districts where blight is prevalent." As a matter of fact, sir, the particular nursery that advertises the chestnut tree works within a radius of possibly 250 miles of Rochester, in a district where there are many prospective horticulturists. One of the things that impressed me more than anything else in the report of the Secretary was the fact that we have lost a large number of members, and that we haven't attracted to ourselves many new members. So far as my personal experience goes, if I were to choose the one method of being most thoroughly disliked, it would be to ask my neighbors, particularly those who do not know me, to become members of any kind of a nut association. There is a glamour about planting, and it is a sort of a disease with some people, year after year, to seek for novelties. These nut tree advertisements that read so well attract many purchasers. Right here in this section people are buying nut trees that they are going to plant in a blighted district, and these people, when they see what utter failures they have, will be so disgusted with nut growing that when you approach them you cannot talk nuts to them, and you will never have them join the Association. More and more are leaving the Association, and very few new ones are coming in to take their places. So I think the resolution ought to be changed.

The President: In what respect would you have it changed?

Dr. Ulman: To apply generally.

Mr. Littlepage: Yes. Well, I agree very largely with what the doctor says. I have always felt that the success of this organization—the success of the nut industry as a whole—depended upon its being upon an entirely truthful, fair and honest basis. I would rather see a crooked cashier in a bank than a crooked nurseryman or tree man. The cashier you can check up at 4:30 every afternoon; you can't check up the crooked tree man for about ten years. I think the worst of all discouraging things to people who want to go to the country to build up farms and homes is to run into alluring, but misleading, advertisements. I have an abounding faith in tree culture. I think that the pecan tree, the black walnut, varieties of the English walnut and of a number of other nut trees, are going to make it most possible and more desirable for men to go to the country, but I think the success of those things depends upon giving those people, as far as possible, facts, and not misleading them. Wherever a man sets a tree that is a failure you have a man as a failure generally as a tree man, and wherever you get a man to set a tree that succeeds, you have a living, walking advocate of the tree business. This Association has been fortunate all along in its policies. It has always stood against the fraudulent promotions; it has always stood against fraudulent nursery stock: it has always stood against fraudulent representations, and I think, for that reason, that its future is reasonably safe, assuming that is its continued policy.

The President: Do you accept Dr. Ulman's amendment?

Mr. Littlepage: I accept it.

Mr. Jones: As I understand the resolution, it applies to nurseries in the infected areas.

Mr. Littlepage: Yes.

Mr. Jones: I believe it is practically impossible to grow trees in an infected area without sending out the blight, but if a man is isolated, like Mr. Riehl, at Alton, Illinois, he can grow trees without danger of sending out the blight.

The President: Well, the resolution permits him to do that.

Mr. M. P. Reed: Did I understand Mr. Kellerman to say the Department hasn't authority to quarantine against such things?

The President: No. The point brought up was the theory that lay back of the quarantine. The speaker made the point that shipment of infected trees was killing the tree aspirations of the people who ought to be developing the nut industry. Every time a man buys a chestnut tree and it dies with blight that man is chilled out of business. Now this resolution doesn't cover that man. It is based on the ground of injury to the industry. You can't very well define the limits of where the blight is not, but it can be fairly well defined as to where it is, and that is up to the Department.

Mr. Littlepage: The resolutions are offered in a suggestive way, Mr. President. If the Secretary wants to turn the suggestion down, we will meet again next year any way.

Prof. Close: I would like some information as to how you propose to take this matter up with the Department. I was present a year or so ago at a hearing before the Federal Horticultural Board—I don't know whether any one else present was there at the time—but the whole thing hinged largely on Colonel Sober's attitude in propagating and sending out the Paragon chestnut, and I think the Department—the Federal Horticultural Board—originated the question that you are discussing now, and Colonel Sober came there with a whole lot of pretty good information, and people to back up what he said, and the Department put up a mighty poor show, I tell you. I was ashamed of what the Department men had to say, and Colonel Sober won out hands down. Now, if this question comes up again, it will be referred, no doubt, to the Federal Horticultural Board, and you will need a good, strong representation, with plenty of facts back of you, and if you can put up a strong enough case there is no doubt but what you can establish this quarantine. But I would hate to see the question taken up again and floored as easily as it was at that time.

THE PRESIDENT: Prof. Close, I have read part of the testimony. — I was not present at the meeting — and when one considers the number of things that were said at that meeting that are not so, and the amount of other evidence that has come up since, I think the defenders of the public will have the material to make a much stronger presentation than they did then, and, what is more, I think some of them will be there. Of course, when a man has a possibility of getting a quarter of a million dollars out of a lot of junk, he can spend money to hire people to say things, and when "the dear public" is paying nobody to go, as was the case last time, nobody goes. If that hearing comes again, I think some from this Association will be present.

PROF. CLOSE: That is just the point I want to bring up. You have got to be there with the information.

MR. LITTLEPAGE: I just want to say a word, rather endorsing what Professor Close has had to say. The Department of Agriculture, the quarantine board, or anybody else, can't go out of their limitations and get testimony. If we think there ought to be a quarantine, then, whenever there is a public invitation sent out, such as was sent out before, we ought to have the nerve to go down there before the Department officials and tell them the truth. It is very easy for us to stand up here and write papers and articles criticising the quarantine board and the Department of Agriculture. If we have anything to say about these things we ought to go down there and say it. If other people come there and present facts as a matter of record, the Board can't entirely go outside of those facts and decide a case right out of the clear sky. If this organization wants to be effective, it ought to appoint a committee to present those things before that Board.

Resolution adopted.

THE SECRETARY: I have had in mind some time the idea involved in this resolution, which I have hastily drawn up.

"Since the principles underlying the successful and economical propagation of nut trees are not yet thoroughly understood or generally known, and much effort is being wasted and much disappointment incurred in unsuccessful or partially successful efforts in propagation.

"Resolved, that it is the sense of this meeting that systematic and controlled experiments be made, under the direction of the Department of Agriculture, for the purpose of determining the principles underlying the successful propagation of nut trees in all sections of the country."

DR. ULMAN: Second that motion. (Carried.)

MR. C. A. REED: I would like to present an invitation to meet at Battle Creek.

MR. ROPER: Petersburg invites us to meet at Petersburg.

THE PRESIDENT: Those matters are settled by the Executive Committee.

MR. T. P. LITTLEPAGE: Would it not be well, Mr. President, to determine upon a meeting place now, and let it be known, so that everybody can prepare for it? Being a member of the Executive Committee, I would prefer myself that the Association take the responsibility for deciding the meeting place. If these meeting places are selected in advance, it makes it possible for a good many people to plan their vacation trips to fit in. In order to get the matter before the Association, I move that the Society determine right now the next meeting place. (Seconded.)

MR. OLCOTT: I think Mr. Littlepage's motion is of more than ordinary importance. The Association, heretofore, has left that matter, very properly, perhaps, to the Executive Committee. The result is that little or no attention is given to the place of meeting until thirty or ninety days before the date of that meeting. It would be very much better if we knew several months ahead about the meeting, and I think we would have a larger attendance and more enthusiasm. The American Association of Nurserymen names the date at the time of their meeting for the following meeting, and most other organizations do the same, and the results are quite perceptible.

(Motion carried.)

THE SECRETARY: We have an invitation from the Evansville Chamber of Commerce, one from the San Francisco Convention League, to meet at San Francisco, one from Sears, Roebuck & Company, to meet in Chicago, and enjoy a luncheon at their expense and a trip through their plant; one from Dr. Morris to meet at his place, or to meet at Stamford and spend as much time as possible on his place. We could meet in New York City and visit Dr. Morris' place very comfortably. We have an invitation from Petersburg, Va.; one to meet with Dr. Kellogg, at Battle Creek, Mich., and one from Mr. Rush to meet at Lancaster, Pa. We have had under consideration a proposition to meet somewhere in the South, possibly with the Southern Nut Growers. Those are all the invitations that I know of.

MR. C. A. REED: May I make a remark right here? It seems to me that before we decide on the place of meeting we ought to take into consideration what we are going to any of these places to accomplish, and the time of year that we want to go there. Now, if we go to Lancaster, or to almost any of these other places, we ought to have a summer meeting when we can go out and see the trees, but if we go up to Battle Creek we could just as well go there in the winter time. The purpose of going there, as I understand it, would be to lay emphasis on the subject of nuts for food. Whether we want to take our time now for a meeting, to emphasize that, or whether we want to see nut trees growing and discuss cultural problems, is a question to be decided.

THE PRESIDENT: In the absence of a definite method of procedure on this question, which we never before handled in this way, the chair is entirely willing to receive instructions, but I suggest that we have a rising vote for one place after another, and that the place receiving the greatest number of votes gets the convention.

MR. M. P. REED: We have seen trees in nurseries for several years, and I think that now we ought to select some place where we can get other and broader ideas on nuts. I think Battle Creek would be the best place.

THE PRESIDENT: Does any other favorite son or neighbor wish to make a speech in favor of his own or nearby city?

MR. HENRY STABLER: It appeals to me very strongly to see Dr. Morris' experimental grounds at Stamford, Connecticut. As I understand it, he has the greatest collection of nut-bearing trees in the United States, and looking over this would help us in a fine way.

Mr. James H. Kyner: Mr. President, I am not a member of this Association, but for a number of years I have been trying to grow nuts. I am very much interested in the subject, and I would like to know if I have any rights on this floor.

Mr. Littlepage: It costs you two dollars to vote.

Mr. Kyner: All right, I will just give two dollars.

Mr. Littlepage: I move that the gentleman be accepted as a full member now and have full authority to make speeches. (Laughter.)

The President: The gentleman will proceed to the making of his speech.

Mr. Kyner: I have no speech. I simply want to vote "aye" for Stamford and New York.

(Vote taken.)

The Secretary: The result is as follows: For Evansville, 2; Stamford, 10; Battle Creek, 3; Petersburg, 3; Lancaster, 1; for Chicago, San Francisco and the National Nut Growers, 0.

The President: We are now ready, I believe, to proceed with the technical part of the programme. The chair would like to call for information as to the relative behavior of the Northern pecans, top-worked or transplanted. Is there, for example, any evidence anywhere as to the fruiting of any Northern pecan except on the parent tree?

Mr. McCoy: Mr. Wilkinson, in Indiana, has some top-worked bearing trees.

The President: Unfortunately, they are right at home. What varieties has he?

Mr. McCoy: The Major.

The President: And how old was it before he top-worked it?

Mr. McCoy: Three years, I think.

The President: On pecan?

A Member: Yes, sir.

The President: The Major bore the fourth year, three years old. I believe that is the first record we have of that sort. Has any other borne?

Mr. McCoy: A good many of my young trees bloom in the nursery, but I don't think they succeeded in setting any nuts.

Mr. M. P. Reed: We have had some two-year trees in nursery, grafted. Most all of them bloomed when two years old — the staminate but not the pestillate blossoms.

THE PRESIDENT: I had a staminate blossom the third season on Butterick in northern Virginia.

MR. HENRY STABLER: Is there any difference between trees budded from young trees in the nursery row which are not in bearing, which have a growth very much resembling water-sprouts, and those budded from bearing trees?

PROF. HUTT: Mr. President, I can't give any experimental data on that line, but the common practice of nurserymen in taking their bud-wood from the nursery stock has been in use for years and years, as with peaches. Very seldom do the nurserymen go to the original trees and get their buds, but it is cut from nursery stock, because it is in a fine condition to work. I think that trees propagated from young, vigorous wood, cut in the nursery, are all right. I am not so sure as to how long it is before they come into bearing.

MR. HENRY STABLER: I don't mean to say it is an undesirable practice to bud from the nursery row, but is there any difference in the time of coming into bearing?

THE PRESIDENT: I spent a very considerable amount of time and money in that belief, but at State College, they made an elaborate test, and they have found no difference between the tree from a water-sprout and one from the bearing tree.

MR. JONES: It is not practicable to propagate very largely from young trees, either fruit trees or nut trees, but there is a good deal in maturity of the wood. The plan we follow is to have mature plots and graft from these old trees. That gives the best wood for nursery propagation.

THE PRESIDENT: Keeping the same tree?

MR. JONES: Yes, right along. That costs a little more money than to propâgate from the nursery, but we think it is better. We get better results.

THE PRESIDENT: How have the different varieties of the northern pecan shown up with regard to speed of growth? At the present time we are practically ignorant as to which of seven or eight named and propagated varieties to count on. Apparently, the Busseron has the record for early bearing, with the Major as second. What about the record of the trees for making wood, not in the nursery row, but after it has been transplanted and put in the field? Is there any distinct leadership of one Northern pecan over another in making wood?

Mr. Littlepage: If the members who go out to my place this afternoon will observe closely they will have a chance to see something of the tree growth for the first three years. They will have a chance to observe the Indiana, the Busseron, the Kentucky, the Green River, the Major and the Posey, with three year's growth. They will see a row of Green Rivers, some trees nine feet high, and others that haven't grown two feet. That is the individual tree variation, however. They will see certain characteristics running clear through.

The President: Well, Mr. Littlepage, it is a job to go and get exact results from another man's experimental ground. Which is the winner for speed, Mr. McCoy?

Mr. McCoy: Well, I know more about how they grow in the nursery than I do when transplanted. I haven't transplanted as many trees as Mr. Littlepage, but, of course, the tree will act very similarly in the nursery to what it does after you transplant it. We have learned at a glance to tell the difference in the varieties. We don't have to go to the books or to the stakes to tell each particular variety, as each variety has its distinguishing characteristics. For instance, the Kentucky and the Butterick and the Busseron are all inclined to grow up. I don't know why that should be true, but they all have the lumber characteristics. The Kentucky grows in the river bottoms surrounded by lumber trees. Now, the Posey doesn't grow very tall, but it grows a wonderful stocky, sturdy tree, and has leaf stems as long as my arm in the nursery. Of course, each particular wood has its color characteristics. But one thing I observed was that in the other nurseries they don't color up as they do in mine. For instance, at Mr. Jones', it will puzzle me sometimes to tell which variety it is by looking at the wood. Of course, after he would say "This is Butterick" or "Busseron," I could see, probably, the characteristics, but there is a little difference in the color of the wood.

The President: Have you found any difference between these three trees as to attainment of height?

Mr. McCoy: Well, I suspect that the Butterick is the fastest grower of them.

The President: What is the slowest?

Mr. McCoy: The Indiana, I guess.

A Member: How does the Major behave?

Mr. McCoy: The Major is a very slender, tall tree. The Green River is inclined to be spreading.

The President: That testimony as to the Indiana being a slow grower — does anybody verify it?

Mr. Littlepage: Same thing in Maryland, Mr. President — slowest grower I have.

The President: Is that sufficiently marked to make it best for us to hold up its propagation until it has shown some reason for being grown?

Mr. Littlepage: I don't know. The Busseron and the Indiana, which is supposed to be a seedling of the Busseron — the Busseron outgrows the Indiana in Maryland five times. But the Indiana is a thin-husked nut. The Busseron, on the other hand, is a thick-husked nut, a fine place for the nut worm if he ever gets bad. There are a lot of such things that you have to think of.

Mr. McCoy: I visited most of these parent trees this year. They are all centered around Evansville. There is no crop on the Busseron. The Indiana will, perhaps, have a peck. In the month of May, in Kentucky, and Indiana, and Illinois, we had rains continually. I have often heard the expression from the Southern nurserymen that "the pecan is caught with the frost." Now, that is clear out of place with us. We all smile at the idea that an Illinois, Indiana or Kentucky pecan would be caught with the frost, which never affects them. But the rains always affect them. If the month of May is a beautiful, dry, clear month, you can gamble on the pecan crop. Now, this year we won't have much of a crop. The Warwick will have a gallon or two, and the Kentucky crop is a failure. The Green River and Major we didn't get to, but I suspect that very few of our own trees will have a crop this year.

Mr. M. P. Reed: Mr. McCoy, I was up there last week, and the Busseron has probably four times as many nuts as the Indiana. It has a light crop, while the Indiana has a very light crop. (Laughter.)

Mr. McCoy: When were you there, Mr. Reed?

Mr. M. P. Reed: Last Sunday.

Mr. Jones: You can't judge a pecan by the growth of the tree. You take a pecan that makes a thick head and lots of limbs, and it is very likely to be a heavy bearer. On the other hand, a nurseryman likes a variety that makes a tree, you know.

The President: On your criterion of a bunched top, which of these eight varieties we are now propagating is the most promising?

Mr. Jones: The Butterick appeals to me.

The President: Is the Posey in the same class?

Mr. Jones: The Indiana makes a thick head.

The President: Does any other do that?

Mr. Jones: The Green River is inclined to on the mature block, but not the first year in the nursery.

Mr. Littlepage: Mr. President, in view of the fact that this meeting is reported, and that what we say will go into the official records to be read by lots of people who can't come and examine us, it might be understood that there would be some question about the bearing of these Northern pecan trees. As a matter of fact, I am surprised that any of them bore any nuts this year when I think how hard Mr. McCoy and Mr. Reed and myself have cut them for bud-wood. As a matter of fact, our opinion is that these Northern pecan trees are all excellent bearers, as the bearing reputation goes with pecan trees. I have watched them pretty carefully, and the best evidence of what I think of them is that I am setting them in my orchard. For fear that the minutes may leave the impression with some casual reader later that these trees bear a quart, and two gallons, I just want to say that if these gentlemen put into the record the amount of nuts that they know the Green River, the Butterick, the Posey and Major have borne — for instance, six weeks ago I bought sixty pounds of Posey nuts from a certain tree. The man who counted them counted 120 pounds on the tree, and if the boys around were as active as when I was a boy, I bet he didn't get more than half of them.

The President: This is the time of year when the squirrels get nuts, and I expect they got after the trees, too.

Miss Louise Littlepage: Why does the rain affect the nuts, and why in that certain one month?

Mr. McCoy: In our latitude the pecan blooms somewhere near the twentieth of May, from that probably up to the twenty-fifth, and the pollen is scattered by the winds, and, if it rains at that particular time, the female bloom perishes, and we have no pecans. I think the pecan depends entirely upon the winds.

The President: We have been hoping all the time that we would have a chance to hear from Prof. Hutt on the relation of the hickory stock to the pecan top. A good many persons have experimented with it, and papers are giving, from time to time, glowing accounts of the pecan tree on hickory roots. We would like to hear from Prof. Hutt.

Prof. Hutt: We haven't much data matured on that at present, Mr. President. It takes so long to get data on those subjects. We have a lot of trees budded on the stocks of water hickory and on the pecan, and we are testing them out. My theory was that the *Hicoria aquatica*, growing in wet, sour lands, would enlarge the range of probable production of pecans on such lands, and on lands on which the pecan, on its own roots, could not normally be grown, but our data are not matured yet. I think they have been three years in the nursery and two years set in the orchard. It will probably be four or five years before we get any exact data on that subject.

The President: Perhaps, Mr. C. A. Reed has investigated some of the later top-worked hickories.

Mr. C. A. Reed: That is an old question — pecan on hickory. It has been tried all over the South and the Southwest, and you will see some this afternoon at Mr. Littlepage's place. As a usual thing, the enthusiasm over pecan on hickory has run high while the experiment was new. The propagator has found that it was not a difficult thing to make the scions live, and, so long as the hickory stock is larger than the pecan scion, so that the feeding capacity is equal to, or even greater than, the consuming capacity of the scion, the outlook has been very satisfactory and encouraging, and while that stage has been going on a great deal has been written. A little later you hear less about it, and less and less, until, finally, you hear almost nothing. But I will say this, that there are sections in the Southwest where there is considerable enthusiasm over it just now. Just recently an article was published by Judge Frank Gwynn which was quite encouraging, and from his point of view it is. He is on high, hilly land, where he has no pecan trees, and he has been able to get nuts considerably sooner by top-working these dryland hickories — the mocker nut, or "bull nut," as it is known down there — and so far he is getting very satisfactory crops. But it is the consensus of opinion over the entire South, so far as I have observed it, that where there are pecan trees suitable for top-working, they answer much better, and the final outcome is very much more satisfactory with pecan on pecan than with pecan on hickory. Now, with pecan on *Hicoria aquatica*, which Prof. Hutt spoke of, I can cite you one instance which is very interesting south of Morgan City, Louisiana. Mr. Frank Beadle, I believe, was the name, top-worked a number of trees that were standing in water, and he also top-worked some that he had transplanted from the wet bottom to higher land. Those that were transplanted lived and bore nuts for quite a number of years. The last I knew they were bearing quite satisfactory crops, but those that were allowed to remain in the standing water died very shortly after the pecan top began to develop. The entire tree died.

THE PRESIDENT: That is, the pecan top killed the native right in its own habitat.

MR. C A. REED: That's right.

DR. STABLER: How about the acidity of the soil on that higher land? Was that tested?

MR. C. A. REED: Well, there would be so very little difference in the level of the soil that I imagine the acidity would be about the same. When I said "high land" I meant land that wasn't overflowed.

DR. STABLER: Oh, yes.

THE PRESIDENT: Mr. Reed, you made the qualified statement awhile go that where a man had a choice between hickory and pecan stock for top-working, he should take the pecan. Now, in the North there are magnificent stands of native hickory — the Appalachians are full of it from end to end. Would you advise him not to bother with that?

MR. C. A. REED: There is another question that enters there. I don't believe that you can grow good pecans on hickory stocks on uplands where there is not moisture enough in the soil to grow good pecans on pecan stocks. It takes moisture to make pecans, and if there isn't enough in the upland soil to grow pecan trees on pecan roots I don't believe there is any evidence to indicate that you can get them on hickory roots.

MR. LITTLEPAGE: Mr. President, the hickory only grows about six or eight weeks every summer, and the pecan grows all summer. I think that answers the question.

PROF. HUTT: A case came up last year in the National Nut Growers' Association that was quite interesting. Mr. Smithwick, of Americus, Georgia, brought to the meeting and exhibited a number of varieties of pecan grown on hickory — fourteen varieties, standard varieties, grafted on a hickory tree, and they were remarkable for their small size. They were remarkably small — smaller than ordinary, woods-grown seedling pecans. There were Schleys and Delmas, and various other varieties that you could recognize by the form of the nuts, but exceedingly small. I believe Mr. Reed's point is the crux of the whole situation, that if you have a good supply of moisture they will make nuts of a pretty fair size, but unless the moisture supply is very large you get diminutive nuts. These were matured in the South. The hickory is such a slow grower in comparison with the pecan — that is, the common varieties — that it can't keep up with the pecan top.

MR. C. A. REED: Some of the nuts from that tree were on exhibition where you were this morning.

THE PRESIDENT: Then you have, practically, a dwarfing, with the dwarfing manifesting itself in the fruit rather than in the wood.

MR. C. A. REED: It did in that one instance, but, on the other hand, we have seen pecans grown on top-worked hickories that you could hardly tell from typical specimens of pecans grown on pecan stocks.

THE PRESIDENT: Isn't the bitternut several times as rapid in growth as the shagbark, or some others? That is, probably, one of the best stocks for the hickories if one wishes to experiment.

MR. C. A. REED: As Colonel Van Duzee said last night, "there are a lot of things we don't know." This is one of them. I might quote a number of men who are right here in this audience to convince you that we don't any of us know much about nut culture today. I will quote Dr. Morris and Mr. Littlepage. We were talking about hickory nut varieties in Dr. Morris' office one night about the first of this year, when Mr. Littlepage made the remark that "the man who didn't change his mind every three years on nut culture didn't keep up with the game," and Dr. Morris replied that he had changed his mind so much in the last five years he had no respect for any man who believed what he said. Now, when you can't believe Dr. Morris, Colonel Van Duzee, or Dr. Smith, what are you going to do with the rest of us?

COL. VAN DUZEE: Mr. Reed, I didn't say what you said I did. I said: "There are so many things you already know that are not true." (Laughter.)

MR. C. A. REED: Well, now, I will quote another man, Dr. Curtis, one of the best known pecan men in the South. It was Dr. Curtis that I went to for my initial experience in pecans. The first I ever saw were in his orchard in Florida, and I asked him quite a good many questions, and he would tell me a story and go away. And I called him up one day, went into his orchard in harvest time when he was gathering the nuts in the hulls and taking them to the packing house. And I said "What is that for?" And he said "Don't you see those shuck worms all through the hulls here? I am throwing them out there to let the chickens get them." "Well," said I, "can you say you are getting rid of the shuck worms by doing that?" And he replied, "I can see, one year with another, that they are gradually getting less." A year later I went down there before he did. He was in Maine at the time, but his orchard trees were just alive with shuck worms, every variety almost eaten up with them. I said to him, when he came back, "I thought you were going to get rid of those shuck worms by feeding them to the chickens?" "Well, there it goes," he said, "you get a nice theory all worked out and some one comes along and asks you a simple little question that knocks it all in the head." And that is almost the unanimous experience. What you know you have got to qualify if you talk at all. I am getting to be such a pessimist I am not much good in the government any more. (Laughter.)

The President: The one hope a college professor of my acquaintance has is when a student comes around and says he believes he doesn't know much. He regards that as the beginning of knowledge, and I think that Mr. Reed's confessions, and incriminations of the rest of us, show one thing, perhaps, better than anything else, and that is the great necessity of organizations of this sort in which many men who are trying many things in many ways come together and give the results of their observations. No doubt, this whole question of agriculture in general, and nuts in particular, is so complex, it is so run through and through with so many different controlling factors, and, with them, so many new things are constantly coming along, that we are all going to be handing down to our children and grandchildren a great and, perhaps, increasing host of problems to be investigated, and new realms in which knowledge can be piled up for the benefit of those who wish to use it.

Col. Van Duzee: Mr. President, may I talk half a minute? I can't help but feel that, perhaps, there may be some good brother or sister who may have been over-impressed with the difficulties, who might have been discouraged, who might have left this meeting, perhaps, and failed to see what this meeting is for — to stimulate the planting of nut trees. Notwithstanding the emphasis that has been put on all these things, notwithstanding the difficulties and disappointments that we are all laboring under at the present time, I feel that we have a wonderful industry ahead of us. I can't see any reason in the world why we should not go on within our means, wisely planting nut trees. It doesn't make any difference if you are seventy-five or eighty years old, plant nut trees, because they will be a constant pleasure to you, and, ultimately, a benefit to some one else.

MR. LITTLEPAGE: Mr. President—

THE PRESIDENT: This is Mr. Littlepage, ladies and gentlemen. (Laughter.)

MR. LITTLEPAGE: That is a very important suggestion that you just made. If you were to ask the average groceryman in Washington City whether he wanted his son to go into the grocery business he would say no. If you asked a lawyer if you should make a lawyer out of your son, if the lawyer looks back over the drudgery and years of toil that it takes to make a lawyer, he would undoubtedly hesitate to recommend it, and if you asked a doctor or a college professor a similar question, they, no doubt, would steer you clear away from a university. And so, Mr. President, if you stand back on the difficulties in these things, there would be not only no grocerymen, but no lawyers, no doctors, no dentists, and, perhaps, nobody working for the government. (Laughter and applause.)

THE PRESIDENT: I want to take the liberty of using thirty seconds in this period of exhortation and confession to come in on the same strain. After all, what is life for? How many of us want the thing that is dead easy, and how many of us want the job with nothing to do? We all, in a certain lazy mood, say we want something easy and want to rest, but if there is anything on earth that a man shuns above all else it is that little room with absolutely nothing to do, namely, a cell. When they want to break a man they don't put him at hard labor on the stone pile; they put him in a little room with nothing to do. The youngster who plays doesn't want a dead easy game. He builds a house, and, when he has done with it, bang, he doesn't want the house he wanted to build. And I must confess that if it were perfectly plain sailing and you could plant out all these nut trees and have them grow like fury, it would not be much fun. It is a fact that men like to achieve and experiment; men like effort. Suppose everybody in this country retired and could put up his feet and do nothing, there wouldn't be a name in the paper the next morning. Mr. Hughes, President Wilson, Mr. Taft, Mr. Brandies, and all of the great men who are doing things in this world would all be gone fanning themselves quietly. This world is run by men who don't have to work; they work for fun. So I wish to submit that the tree — if a man happens to be built to love plants that grow — that the tree is one of the great avenues of fun.

MR. WEBER: Mr. President, along the same line of thought, I wish to express my views with what Colonel Van Duzee has had to say. If we were to attend a convention of surgeons and hear different diseases and ailments of the body discussed, we would probably all be disposed to think that we were standing on the tip-end of the diving board into eternity beyond. But people keep on living just the same, notwithstanding the knocking of the doctors, and the diseases to which we are subject, and trees will keep on growing just the same, nothwithstanding their diseases and various other troubles, and so I think no one should be discouraged.

THE SECRETARY: I just want to add my little encouragement. In spite of all the failure that I have had, and they have been many, in spite of the reports of failures of others and the pessimism of others, I have the same abiding faith in the future of nut growing, and just the same enthusiasm for it that I had in the beginning, if not greater. (Applause.)

MR. KYNER: Mr. President, I came here to get information on a matter that I am very much interested in. At seventy years of age I have become interested in nut growing — in nut culture. (Applause.) I am not planting particularly for myself, not that I expect to get any harvest from these trees, but I do want to see them bear fruit — bear nuts. I want to plant the right kind of trees. I have joined this Association; I intend to retain a membership in it as long as the Association lives. (Laughter.)

THE PRESIDENT: My dear sir, that will cost you twenty dollars for a life membership. (Laughter.)

MR. KYNER: And I want to get all the information that the Association has. Now, if I can get it in fifteen or twenty minutes, why, let me have it. (Laughter.) I bought Persian walnuts at a nursery, cultivated them, and watched them, walked around them and looked at them, and along came a winter and killed them. I bought them from a Rochester nursery. Now, they didn't grow them there. They must have grown them somewhere else. If they had been grown in a Rochester nursery they would have withstood the severity of a Maryland winter. Now, there is something wrong there. This Association should take this matter up with that nursery. They should not be allowed to take people's money and give them chaff for it. I am saying this for the benefit of some of our members here who are growing nut trees for sale.

THE PRESIDENT: May I give you a bit of information here? We have a list of accredited nurserymen. This Association has a list of nurserymen in whose trees we think we can place more confidence than in some others.

MR. KYNER: I would like to get that. But now I have set out a whole lot of these Persian walnuts, and pecans, filberts, Japanese walnuts, etc., and I guess every one of them is a seedling, and I don't know what I have, and I don't know how many varieties of Japanese walnuts there are. I supposed a Japanese walnut was a Japanese walnut, and that that was all there was to it. But I get some trees from one nursery, and some from another, and they grow up and aren't alike at all. Now, I haven't so very awfully long to be in the business of setting out nut growing trees, and I want to get the right kind, and I want this Association's assistance in that matter, and while you are assisting me you are assisting people all over the country. Men and women everywhere are interested in nut growing. They want nut trees, but how are they going to know that they are getting what they want? I believe it is up to this Association to help them get the right kind of stuff. I came in here purposely to get your help.

THE PRESIDENT: You go on the excursion this afternoon and you will find plenty of men there that will take pleasure in explaining some of these things to you. Our plan is to go at one o'clock from the corner of Fourteenth and H streets to the grounds of Mr. Littlepage, who has practically all the good varieties of northern pecans growing there, and on the trip will be men who can answer most every question you want to know. I think that brings us to the point of adjournment.

COL. VAN DUZEE: Mr. President, I move we adjourn.

A MEMBER: Second the motion.

THE PRESIDENT: The meeting stands adjourned.

APPENDIX.

Letter From W. C. Reed, Vice-President of the Association.

FELLOW MEMBERS AND FRIENDS:

It is with the deepest feelings of regret that I am compelled to be absent from what I trust may be one of the most profitable meetings of the Association. It is impossible for me to be present, owing to the fact that I have been summoned on a case in court in Wisconsin.

Having been honored as your Vice-President, I felt it my duty to attend and do what I could to help make this our best meeting, but fate ruled otherwise. Though absent in person, I assure you my thoughts and best wishes will be with you while wandering about the Nation's Capital, viewing its magnificent parks and basking under the shade of its stately Persian walnuts.

The interest in nut culture is widespread. We have had inquiries from many foreign countries, one of the last from near Bombay, British India.

I have arranged with the Indiana Apple Show, which is to be held at West Baden, Indiana, November 14th to 20th, for ample space for a nut exhibit. Anyone having nuts for exhibition should send them to me at Vincennes prior to these dates, or write for information, and I will try and arrange for premiums.

REVIEW OF PAST YEAR.

The present summer has been of extremes, very cold and wet early, followed by extreme heat and drouth. Foliage of all kinds not as good as usual. Nut trees, however, have made a very good growth, not as heavy as last year on younger trees.

Winter, 1915-16, while not extremely cold, was very hard on many kinds of trees, owing to the fact that the previous summer and fall were very wet. Most fruit trees went into winter full of sap, with buds in weakened condition. Pecan buds came through in good shape with a very fair stand in nursery, and one-year trees were not injured a particle. Pecan bloom was very fair, crop, generally seems to be light, in fact such is the case with all kinds of nut trees, generally, and most fruit trees. Pecan trees set in orchard 2 and 3 years ago are making a good growth.

English Walnuts.

Stand of buds in nursery poor; stand of grafts this spring very good where we used good, strong scions of well matured wood, 60 to 75 per cent, and in some cases Mayette was better than that. Where Eastern scions were used from old trees, stand of grafts very poor. All one-year English walnut trees in nursery came through in good shape. Eastern varieties began to vegetate or burst into growth April 15; Mayette and Franquette, May 1; Parisienne, May 5, and one tree from Grenoble, France, grown from scion sent from Department of Agriculture, May 25. These French varieties, I feel, are very promising, owing to the fact that they will escape late frosts. English walnut trees in orchard set 3 years ago, fourth summers growth, doing splendidly, 2 to 4 feet of growth, foliage perfect, varieties, Hall, Rush, Nebo and Burlington. Top-worked trees, 3-year tops doing nicely of Hall, Rush, Mayette and two or three other Eastern varieties. Grafting in nursery done from May 15 to 25, was best after stocks were in full leaf.

Pecan Grafting.

We have usually had best success grafting May 5 to 12, but this year, being a late spring, we did not commence general grafting of pecans until the 12th, and it seems to have been too late. Stand very poor, a few grafts set early in May with old wood, about 40 per cent. stand. We find old wood gives much better stand on pecans, and new wood on English walnuts.

Black Walnuts.

Grafted quite a number of Stabler Black Walnuts, which were almost a failure. Thomas done better, but still poor. However, larger scions gave best results and have made splendid growth, many 5 to 6 feet, very strong. Buds of Thomas set last fall failed to start well. It seems we have something to learn in the propagation of the Black Walnut, as it has proved more difficult than the English.

HARDY ALMOND.

Two years ago we received some buds of the Ridenhauer Almond from Department of Agriculture. Some of these buds were set on a bearing peach tree; these have borne a good crop this summer, and were gathered August 20, some of which are on the exhibition tables. These seem to bear very young, of good quality, a very strong grower and very hardy; do not consider them of any commercial value, but for family use are very good.

BEARING PECANS IN NEBRASKA.

During the past year I have received photographs and description of the pecan trees 12 miles south of Lincoln, Nebraska, and of two trees on the grounds of E. Y. Grupe, of Lincoln. These trees are 20 years old, some having been bearing regular crops for the past 10 years. This season's crop is a failure owing to continuous cold rain at blooming time. The nuts on one of these trees are of fair size and quality.

With kindest regards to the many friends in the Association, and trusting that I may have the pleasure of greeting all at our next annual meeting, I am,

Respectfully yours,

W. C. REED.

THE FOOD VALUE OF NUTS.

Dr. J. H. Kellogg, Battle Creek, Michigan.

Of all really valuable foodstuffs nuts are the least used and the least appreciated. In fact, nuts can hardly be said to constitute a part of the national bill of fare for the reason that when eaten at all they are taken as luxuries or deserts and not as staple foods. But the nut possesses special properties which entitle it to first consideration as a foodstuff, and the writer has no doubt that some time in the future nuts will become a leading constituent of the national bill of fare, and in so doing, will displace certain foodstuffs which today are held in high esteem, but which in the broader light of the next century will be regarded as objectionable and inferior foods and will give place to the products of the various varieties of nut trees which will then be estimated at their true worth, the very choicest of all substances capable of sustaining human life. Botanically, a nut is a fruit, but nuts differ so widely both in composition and appearance from the foods commonly called fruits that they are properly placed in a class by themselves.

In nutritive value the nut far exceeds all other food substances; for example, the average number of food units per pound furnished by half a dozen of the more common varieties of nuts is 3231 calories, while the average of the same number of varieties of cereals is 1654 calories, half the value of nuts. The average food value of the best vegetables is 300 calories per pound and of the best fresh fruits grown in this country is 278 calories. The average food value of the six principal flesh foods is 810 calories per pound, or one-fourth that of nuts.

The superior nutritive value of nuts is clearly shown by the accompanying tables based upon the analyses of Atwater and other authorities.

TABLE I.

COMPOSITION OF NUTS (C. F. LANGWORTHY).

			Composition and Fuel Value of the Edible Portion.					
	Refuse. Per ct.	Edible Portion. Per ct.	Water. Per ct.	Protein. Per ct.	Fats. Per ct.	Carbohydrates. Per ct.	Ash. Per ct.	Food Value per lb. Cal.
Almonds	64.8	35.2	4.8	21.0	54.9	17.3	2.0	3,030
Brazil nuts........	49.6	50.4	5.3	17.0	66.8	7.0	3.9	3,329
Filberts	52.1	47.9	3.7	15.6	65.3	13.0	2.4	3,432
Hickory nuts......	62.2	37.8	3.7	15.4	67.4	11.4	2.1	3,495
Pecan nuts........	53.2	46.8	3.0	11.0	71.2	13.3	1.5	3,633
English walnuts....	58.0	42.0	2.8	16.7	64.4	14.8	1.3	3,305
Chestnuts, fresh....	16.0	84.0	45.0	6.2	5.4	42.1	1.3	1,125
Chestnuts, dried....	24.0	76.0	5.9	10.7	7.0	74.2	2.2	1,875
Acorns	35.6	64.4	4.1	8.1	37.4	48.0	2.4	2,718
Beechnuts	40.8	59.2	4.0	21.9	57.4	13.2	3.5	3,263
Butternuts	86.4	13.6	4.5	27.9	61.2	3.4	3.0	3,371
Walnuts	74.1	25.9	2.5	27.6	56.3	11.7	1.9	3,105
Cocoanuts	48.8	51.2	14.1	5.7	50.6	27.9	1.7	2,986
Cocoanuts, shredded,	...	100.0	3.5	6.3	57.3	31.6	1.3	3,125
Pistachios, kernels..	...	100.0	4.2	22.6	54.5	15.6	3.1	3,010
Pine nuts or pinons	40.6	59.4	3.4	14.6	61.9	17.3	2.8	3,364
Peanuts, raw......	24.5	75.5	9.2	25.8	38.6	24.4	2.0	2,560
Peanuts, roasted....	32.6	67.4	1.6	30.5	49.2	16.2	2.5	3,177
Litchi nuts........	41.6	58.4	17.9	2.9	.2	77.5	1.5	1,453

TABLE II.

COMPOSITION OF MEATS (ATWATER AND LANGWORTHY).

	Water.	Protein.	Fat.	Calories per lb.
Beef ribs	43.8	13.9	21.2	1,135
Porterhouse steak	52.4	19.1	16.1	975
Veal cutlet	68.3	20.1	7.5	695
Mutton	51.2	15.1	14.7	890
Mutton chops	42.	13.5	28.3	1,415
Lamb	52.9	15.9	13.6	860
Pork chops	41.8	13.4	24.2	1,245
Ham, smoked	34.8	14.2	33.4	1,635
Bacon, smoked	17.4	9.1	62.2	2,715
Sausage, Frankfort	57.2	19.6	18.9	1,155
Beef soup	92.9	4.4	0.4	120
Chicken (fowl)	47.1	13.7	12.3	765
Goose	38.5	13.4	29.8	1,475
Turkey	42.4	16.1	18.4	1,060
Duck	51.7	14.3	33.4	1,805
Squab	58.	18.6	22.1	1,430
Guinea hen	69.1	23.1	6.5	870
Quail	65.9	25.	6.8	935

TABLE III.

COMPOSITION OF CEREAL FOOD (LANGWORTHY).

	Protein.	Fat.	Carbohydrates.	Ash.	Food Value
Flour, meal, etc.:	Per ct.	Per ct.	Per ct.	Per ct.	per lb.
Entire wheat flour	13.8	1.9	71.9	1.0	1,650
Graham flour	13.3	2.2	71.4	1.8	1,645
Wheat Flour, patent roller process —high grade and medium	11.4	1.0	75.1	.5	1,635
Macaroni, vermicelli, etc.	13.4	.9	74.1	1.3	1,645
Wheat breakfast food	12.1	1.8	75.2	1.3	1,680
Buckwheat flour	6.4	1.2	77.9	.9	1,605
Rye flour	6.8	0.9	78.7	.7	1,620
Corn meal	9.2	1.9	75.4	1.0	1,635
Oat breakfast food	16.7	7.3	66.2	2.1	1,800
Rice	8.0	.3	79.0	.4	1,620
Tapioca	.4	.1	88.0	.1	1,650
Starch	..	..	90.0	..	1,675

TABLE IV.

COMPOSITION OF VEGETABLES (EDIBLE PORTION).

	Water. Per ct.	Protein. Per ct.	Fat. Per ct.	Carbohydrates. Per ct.	Calories per lb.
Beans, dried	12.6	22.5	1.8	59.6	1,520
Beans, lima	...	...	..	...	....
Beans, string	83.0	2.1	.3	6.9	170
Beets	70.0	1.3	.1	7.7	160
Cabbage	77.7	1.4	.2	4.8	115
Celery	75.6	.9	.1	2.6	65
Corn, green (sweet), edible portion	75.4	3.1	1.1	19.7	440
Cucumbers	81.1	.7	.2	2.6	65
Lettuce	80.5	1.0	.2	2.5	65
Mushrooms	88.1	3.5	.4	6.8	185
Onions	78.9	1.4	.3	8.9	190
Parsnips	66.4	1.3	.4	10.8	230
Peas	74.6	7.0	0.5	16.9	440
Potatoes	62.6	1.8	.1	14.7	295
Rhubarb	56.6	.4	.4	2.2	60
Sweet potatoes	55.2	1.4	.6	21.9	440
Spinach	92.3	2.1	.3	3.2	95
Squash	44.2	.7	.2	4.5	100
Tomatoes	94.3	.9	.4	3.9	100

TABLE V.

COMPOSITION OF FRUITS, YEARBOOK OF DEPT. OF AGRICULTURE, 1915.

(C. J. LANGWORTHY).

Kind of Fruit. Fresh Fruits.	Water. Per ct.	Protein. Per ct.	Ether extract. Per ct.	Nitrogen-free extract. Per ct.	Carbo-hydrates. Per ct.	Crude fiber. Per ct.	Ash. Per ct.	Fuel value per lb. Cal.
Apples	84.6	0.4	0.5	13.0	...	1.2	0.3	290
Apricots	85.0	1.1	...	...	13.4	...	.5	270
Avocado	81.1	1.0	10.2	...	6.8	...	.9	512
Bananas	75.3	1.3	.6	21.0	...	1.0	.8	460
Blackberries	86.3	1.3	1.0	8.4	...	2.5	.5	270
Cactus fruit	**79.2**	**1.4**	**1.3**	**11.7**	...	**3.7**	**2.7**	**375**
Cherries	80.9	1.0	.8	16.5	...	.2	.6	365
Cranberries	88.9	.4	.6	8.4	...	1.5	.2	215
Currants	85.0	1.5	...	...	12.8	...	.7	265
Figs	79.1	1.5	...	...	18.8	...	.6	380
Gooseberries	85.6	1.0	...	...	13.1	...	.3	255
Grapes	77.4	1.3	1.6	14.9	...	4.3	.5	450
Guava	82.9	1.3	.7	8.0	...	6.6	.5	315
Huckleberries	81.9	.6	.6	...	16.6	...	.3	345
Lemons	89.3	1.0	.7	7.4	...	1.1	.5	205
Mango	87.4	.6	.4	9.9	...	1.2	.5	220
Muskmelons	89.5	.6	...	7.2	...	2.1	.6	185
Nectarines	82.9	.6	...	...	15.9	...	.6	305
Olives	67.0	2.5	17.1	5.7	...	3.3	4.4	407
Oranges	86.9	.8	.2	...	11.6	...	.5	240
Peaches	89.4	.7	.1	5.8	...	3.6	.4	190
Pears	80.9	1.0	.5	15.7	...	1.5	.4	163
Persimmons (Japanese)	80.2	1.4	.6	15.1	...	2.1	.6	174
Pineapples	89.3	.4	.3	9.3	...	.4	.3	200
Plums	78.4	1.0	...	...	20.1	...	.5	395
Pomegranates	76.8	1.5	1.6	16.8	...	2.7	.6	461
Prunes	79.6	.9	...	...	18.9	...	.6	370
Raspberries (red)	85.8	1.0	...	9.7	...	2.9	.6	255
Rhubarb stalks	94.4	.6	.7	2.5	...	1.1	.7	105
Strawberries	90.4	1.0	.6	6.0	...	1.4	.6	180
Watermelons	92.4	.4	.2	...	6.7	...	.3	140

With the exception of smoked bacon, there is no flesh food which even approaches the nut in nutritive value, and bacon owes its high value to the fact that it consists almost exclusively of fat.

That the nut is appreciated as a dainty is attested by the frequency with which it appears as a desert and the extensive use of various nuts as confections. That nuts do not hold a more prominent place in the national bill of fare is due chiefly to two causes; first, the popular idea that nuts are highly indigestible, and second, their comparatively high price.

The notion that nuts are difficult of digestion has really no foundation in fact. The idea is probably the natural outgrowth of the custom of eating nuts at the close of a meal when an abundance, more likely a super-abundance, of highly nutritious foods has already been eaten and the equally injurious custom of eating nuts between meals. Neglect of thorough mastication must also be mentioned as a possible cause of indigestion following the use of nuts. Nuts are generally eaten dry and have a firm hard flesh which requires thorough use of the organs of mastication to prepare them for the action of the several digestive juices. Experiments made in Germany showed that nuts are not digested at all but pass through the alimentary canal like foreign bodies unless reduced to a smooth paste in the mouth. Particles of nuts the size of small seeds wholly escaped digestion.

Having been for more than fifty years actively interested in promoting the use of nuts as a staple food, I have given considerable thought and study to their dietetic value and have made many experiments. About twenty-five years ago it occurred to me that one of the above objections to the extensive dietetic use of nuts might be overcome by mechanical preparation of the nut before serving so as to reduce it to a smooth paste and thus insure the preparation for digestion which the average eater is prone to neglect. The result was a product which I called peanut butter. I was much surprised at the readiness with which the product sprang into public favor. Several years ago I was informed by a wholesale grocer of Chicago that the firm's sales of peanut butter amounted on an average to a carload a week. I think it is safe to estimate that not less than one thousand carloads of this product are annually consumed in this country. The increased demand for peanuts for making peanut butter led to the development of "corners" in the peanut market and more than doubled the price and must have had an equally marked influence upon the annual production.

I am citing my experience with the peanut not for the purpose of recommending this product, for I am obliged to confess that I was soon compelled to abandon the use of peanut butter prepared from roasted nuts, for the reason that the process of roasting renders the nut indigestible to such a degree that it was not adapted to the use of invalids, but simply as an illustration of the readiness with which the public accepts a new dietetic idea when it happens to strike the popular fancy. Ways must be found to render the use of nuts practical by adapting them to our culinary and dietetic customs and to overcome the popular objections to their use by a widespread and efficient campaign of education.

Attention has already been called to the superior nutritive value of the nut. It has other excellencies well worthy of consideration: for example, the protein of nuts is of the very choicest character. Recent investigations by Rubner, Osborne, Mendel, and others have shown that every plant produces its own special varieties of proteins. There is indeed a wide difference even between the proteins of various cereals and the proteins of many vegetables differ so widely in character from those of the human body that it is doubtful whether to any extent they can be utilized for human nutrition. Fortunately the potato is in this regard an exception and furnishes a very excellent type of protein. This objection does not apply to nuts. The proteins of nuts are in fact so very closely allied to those of the animal body that food chemists of a generation ago referred to the protein of nuts as vegetable casein because of its exceedingly close resemblance to the protein of milk.

The fats of nuts, their leading food principle, are the most digestible of all forms of fat. Having a high melting point, they are far more digestible than animal fats of any sort. The indigestibility of beef and mutton fat has long been recognized. The fat of nuts much more closely resembles human fat than do fats of the sort mentioned. The importance of this will be appreciated when attention is called to the fact that fats entering the body do not undergo the transformation changes which take place in other foodstuffs; for example, protein in the process of digestion is broken into its ultimate molecular units. Starch is transformed into sugar, which serves as fuel to the body, but fats are so slightly modified in the process of digestion and absorption that after reaching the blood and the tissues they are reconstructed into the original form in which they are eaten; that is, beef fat is deposited in the tissues as beef fat without undergoing any chemical change whatever; mutton fat is deposited as mutton fat; lard as pig fat, etc. When the body makes its own fat from starch and sugar, the natural source of this tissue element, the product formed is *sui generis* and must be better adapted to the body uses than the animal fat which was *sui generis* to a pig, a sheep, or a goat. It is certainly a pleasant thought that one who rounds out his figure with the luscious fatness of nuts may felicitate himself upon the fact that his tissues are participating in the sweetness of the nut rather than the relics of the sty and the shambles. It is true that nuts are poor in carbohydrates; that is, they contain no starch and little sugar, but this deficiency can be easily supplied by fruits, as will be readily seen by reference to Table V.

Of the three great food principles required for human nutrition, protein, fats, and carbohydrates, the nut supplies two—protein and fats in rich abundance, and of very finest quality. The amount of protein found in fruits with very few exceptions is so small as to be insignificant; fats are practically wholly absent from fruits, while sugar and dextrine are abundant. Fruits are thus the natural complement of nuts.

The amount of protein contained in nuts is, with two or three exceptions, small as comparel with meats, and even some of the cereals; but the studies of nutrition which have been made within the last score of years by Chittenden and numerous other investigators have clearly established the fact that protein which is chiefly represented in the ordinary bill of fare by lean meat, is needed only in very small amount. If the amount of protein eaten equals ten per cent of the total ration the body will receive an abundant supply of material for repairing its nitrogenous tissues, the only function for which protein is essential. Some nuts, as the pine nut and the peanut, are rich in protein. A pound of pine nuts contains as much protein as a pound and a half of lean meat, besides furnishing the equivalent to two-thirds of a pound of butter. The almond is also rich in protein.

But nuts have another special excellence which is worthy of consideration. Recent researches have shown the paramount importance of vitamines—certain subtle elements which are needed to activate or set in operation various processes within the body which are essential to complete nutrition. The vitamines of rice and other cereals are removed with the bran; hence an exclusive diet of polished rice gives rise to *beriberi*. Meat contains vitamines in very small amounts, for vitamines are produced only by plants. The vitamines found in flesh foods represent only the small residue of the supplies which the animal gathered from the grass, corn and other vegetable products which constitute its food.

Twenty years ago, when the diet of sailors consisted chiefly of salt pork, *scurvy* was a dread scourge which often disabled whole ship crews and sent many a poor seaman into "Davy Jones' locker." The cooking of animal foods destroys the vitamines which they contain. Infants suffer from scurvy when fed on sterilized or pasteurized milk. There is good reason for believing that *pellagra* is due to a deficiency of vitamines, which are conspicuously absent from a dietary consisting of "sow belly," molasses, tea, coffee, lard, cornmeal, fine flour and polished rice.

Nuts are rich in vitamines. In fact, the nut consists of the choicest aggregation of all the materials essential for the building of sound human tissues, done up in a hermetically sealed package ready to be delivered by the gracious hand of Nature to those who are fortunate enough to appreciate the value of this choicest of all earth's bounties.

As already noted, nuts consist almost wholly of the two principles, fat and protein. The same is true of meats. Nuts contain more fat and less protein and in this particular as well as others which have been mentioned are better prepared to serve as nutrients to the body than are meats. Besides, nuts have the advantage of being clean, free from the products of disease and putrefaction. Meats of all sorts, as found in the market, with the exception of canned meats, abound with putrefactive bacteria to an astonishing degree. This is true of dried, smoked and salted meats as well as of the fresh meats and game which are displayed upon the walls of the meat shop. An examination of various meats made some time ago by A. W. Nelson, bacteriologist of the Battle Creek Sanitarium, showed the presence of putrefactive bacteria in almost unbelievable numbers, as will be seen by an inspection of the following table:

TABLE VI.

	Specimen.	No. Putrefactive Bacteria per ounce.
1.	Large sausage	12,600,000,000
2.	Small sausage	19,890,000,000
3.	Round steak	16,800,000,000
4.	Roast beef	16,800,000,000
5.	Smoked ham	1,293,600,000
6.	Hamburger steak	3,870,000,000
7.	Pork	3,781,200,000
8.	Porterhouse steak	900,000,000
9.	Sirloin steak	11,340,000,000
10.	Tenderloin (well done)	756,000,000
11.	Tenderloin (rare)	5,040,000,000

Repeated subsequent examinations have given similar results. These results also agree with observations made by various other German and American bacteriologists. Decomposition of amimal flesh begins immediately after the animal dies. Within twenty-four hours after killing, even though the carcass is kept in an ice box or refrigerater, the whole mass is permeated with putrefactive bacteria. Refrigeration even to a point close to freezing delays but does not prevent the growth of putrefactive organisms although at lower temperatures the usual volatile products which give notice of the presence of putrefaction by an odor of decay are not produced. Persons whose stomachs manufacture a liberal amount of hydrochloric acid, an essential constituent of healthy gastric juice, are able to disinfect even highly putrescent meat, so that they apparently do not suffer any immediate injury when such meat enters the stomach. In a stomach which produces little or no hydrochloric acid, the process of putrefaction continues all the way through the alimentary canal, giving rise to the same poisonous substances which are present in the putrefying carcass of a dead rat or any other dead animal, and produces intestinal or alimentary toxemia with the multitude of mischiefs which grow out of this condition, among which may be mentioned all sorts of skin troubles, high blood-pressure, apoplexy, premature sensility, Bright's disease, heart failure, gallstones—a list which might be increased by the addition of scores of other common, chronic maladies.

When one recalls the statement made before the congressional committee by the chief of the United States meat inspection service that if all animals, any part of which was diseased, were rejected by inspectors, not more than one in a hundred would pass muster; and when one also reflects upon the wide prevalence of tuberculosis in animals,—at least ten per cent of all the cows in the country are known to be tuberculous,—and the growing prevalence of tapeworm and trichinae, diseases which are exclusively derived from the eating of flesh, and then contemplates the purity and perfection of the choice little food packets which we call nuts, it is easy to be persuaded that a substitution of nuts for flesh foods, even on a very large scale, would be not only a perfectly safe procedure, but one which would be followed by the most desirable results.

The use of nuts as a staple article of food is not an experiment. All the higher apes, man's nearest relatives in the animal world, thrive on nuts. Many savage tribes live almost entirely on nuts. The Indians of the foothills of California gather every fall large quantities of nuts which they store for winter use. The early settlers of California reported also that many tribes of Indians in that part of the United States lived almost wholly upon acorns. Before the great oak forests of this country were cut down for lumber, millions of hogs were fattened on mast, and the price of pork depended more upon the acorn crop than on the corn crop. The peasantry of southern France and northern Italy during half the year make two meals a day on chestnuts.

The objection commonly urged, that nuts are too expensive to enter largely into the ordinary bill of fare, at first sight appears to be valid, but upon examination this objection almost, if not wholly, disappears. For example, a pound of pine nuts which is more than the equivalent in nutritive value to two and a half pounds of the best beefsteak and two-thirds of a pound of butter, can be bought wholesale for twenty-five cents. The cost of the equivalent food value in meat and butter would be at least sixty to seventy cents, or more than double the cost of the nuts. A pound of almonds can be bought at wholesale for forty cents, and has food value equal to that of meat which would cost a dollar or more. A pound of peanuts can be bought at wholesale for seven or eight cents, and furnishes nutritive value equivalent to more than a pound of beefsteak and a half a pound of butter, which would cost forty-five to fifty cents, or seven times as much. No objection can be offered to the fact that we are comparing wholesale with retail prices, for the reason that nuts do not readily spoil as do meat and butter, but will keep in perfect condition for months. Further it is entirely reasonable to suppose that the price of nuts may sometime in the future be considerably reduced when the cultivation of nuts becomes more general, and especially when the United States Forestry Department becomes convinced that it would be a sensible thing to cover with nut trees some of the large areas which have in the last fifty years been laid waste by deforestation. The planting of nut trees along all the public highways of the country would in less than twenty years result in a crop, the food value of which would be greater than that at present produced by the entire livestock industry of the country.

The high price of meat of which so much complaint has been made in recent years is not likely to recede. The high price is not due to manipulations of the market, but to natural causes, the chief of which is the limitation of pasturage and is the consequence of a decrease in the number of livestock. As the country becomes more and more densely settled, the difficulty of supplying the demand for meat will increase, and in time the necessity for utilizing every foot of ground in the most efficient manner, will necessarily bring about a change in the dietetic habits of the people. Not a single example can be found in the world of a densely populated country dependent upon its own resources in which flesh foods constitute any considerable part of the national bill of fare. Since Germany has been nearly shut off from the outside world by the present war, the government has found it necessary to restrict the consumption of meat to one-half pound per week for each adult. All other European countries are equally dependent on outside sources for their meat supply.

The time will certainly come when nuts and nut trees will become a most important food resource. If a reform in this direction could be effected within the next ten years, the result would be a disappearance to a large extent of the complaint of the high cost of living. Mr. Hill said the basis for complaint was not the high cost of living, but the cost of high living. I should prefer to say that the real cause for complaint was wrong living rather than high living, or necessarily high cost. With right living the cost will be automatically reduced. For example, suppose a person were content to choose the peanut as his source for protein and fat, the elimination of the butcher's bill for meat and the grocer's bill for butter would at once cut out two-thirds of the expense incurred for food.

When a student in college more than forty years ago, I was already making dietetic experiments and lived three months on a diet such as I have suggested, at an average expense of exactly six cents a day. This was the total amount expended for raw foodstuffs. I paid my landlady five times as much for preparing and serving the food, and had reason for believing that some portion of my supplies was utilized by others than myself. As evidence of the fact that the experiment was not dangerous, I may add that I have pursued the same meatless dietary during my entire lifetime since, as I had done for ten years before, and I am still alive and hard at work. Man is naturally a frugivorous animal. According to Cuvier, the great French naturalist, the natural diet of human beings, like that of those other primates, the orangoutang, the chimpanzee, and the gorilla, consists of fruits, nuts, tender shoots and cereals. A sturdy Scotch highlander informed me that his diet consisted of brose, bannocks, and potatoes, and that he rarely ever tasted meat. When asked what he fed his dogs, he replied, "The same as I eat myself, sir." The high-bred foxhounds of the southern states are fed on cornmeal, oatmeal and bread, and rarely taste flesh of any sort. Dogs thus fed are hardier, healthier, have more endurance, better wind, keener scent, greater intelligence, and are more easily trained than meat-fed dogs. A diet which is safe for carnivorous animals, must certainly be safe for human beings, who belong to a class of animals all representatives of which, with the exception of man are flesh abstainers.

Some years ago I experimented with various sorts of carnivorous animals for the purpose of ascertaining whether nuts could be made a complete substitute for meat. Among the various animals utilized for the experiment was a young wolf from the northwest that had never eaten anything but fresh raw meat. After giving the animal one day to get accustomed to its new surroundings and to acquire a good appetite, I gave him a breakfast of nuts properly prepared and was delighted to find that he took to the new ration without the slightest hesitation and remained in excellent health during the several months of the experiment. I succeeded perfectly in substituting nuts for meat with all the animals experimented upon, including a fish hawk, with the single exception of an old bald-headed eagle, which refused to be converted.

I have a suspicion that the so-called carnivorous animals were all at some remote time nut eaters; the so-called carnivorous teeth would be as useful in tearing off the husks of cocoanuts and similar fruits, as for tearing and eating flesh.

An economic argument for the general adoption of nuts as a suitable article of food is the enormous increase in food resources which such a change would bring about. Some years ago, an experienced stock-raiser informed the writer that it takes two acres of land and two years to produce a steer weighing 600 pounds when dressed. Fresh meat is three-fourths water; hence the food material actually represented by such an animal would be considerably less than one hundred and fifty pounds, allowing for the weight of the bones. The food value, estimated as dried meat, would be about sixteen hundred calories per pound, or the same as an equal quantity of wheat meal. That is, an acre of land would produce in the form of beef, the food equivalent of seventy-five pounds of wheat in two years, whereas, a single acre of grain would produce on an average, even when poorly cultivated, in two crops not less than thirty-two bushels of more than 1900 pounds of wheat, or more than twenty-five times as much food as the same land would produce in the same length of time in the form of beef. Humboldt showed that the banana would furnish sustenance for twenty-five times as many people as could be nourished by the wheat produced by the same area of land; and according to Hutchinson, the chestnut tree is capable of producing on a given area a still larger amount of nutrient material than the banana. In other words, an acre of ground covered with chestnut trees in full bearing will furnish food for more than six hundred times as many people as could be supported by the same area devoted to meat production.

As a source of protein and fats the nut is vastly superior to the ox and the pig. The nut is sweeter, cleaner, safer, healthier and cheaper than any possible source of animal products.

This choicest product of Nature's laboratory is just beginning to be appreciated. When the Nut Growers' Association celebrates its one hundredth anniversary, it is safe to predict that the descendants of the present generation of nut growers who have followed the example of their forebears, will be living in opulence and will be regarded as the saviors of their country, while the great abattoirs and meat packing establishments will have ceased to exist, and the merry click of the nut cracker will be heard throughout the land.

EXTRACTS FROM A LETTER FROM COLONEL J. C. COOPER, OF McMINNVILLE, OREGON, PRESIDENT OF THE WESTERN WALNUT ASSOCIATION.

(Prepared by W. J. SPILLMAN, Chief of the Office of Farm Management U. S. Dept. of Agr., to be read at the 7th Annual Meeting of the N. N. G. A.)

It is probable that the prominence given the walnut growing industry in Oregon and the Northwest is greater than the finished product will justify at present, yet it is growing all the time in spite of the methods in use. I say in spite of the methods rather than because of the methods in use, for the reason that hundred of thousands of trees have been set out in the last ten or twelve years, a majority of which have failed to meet the expectations of the would-be growers. These expectations, however, have been based largely on the statements of boom literature of those who have trees and lands for sale. We have much land in Western Oregon that is suited to the growing of walnuts, and some trees and orchards that are doing well, but there are more individual trees that are giving their owners profits than there are orchards.

The industry will continue to grow, I will repeat again, in spite of the cultural methods we use, but we must certainly change our methods or our trees, or both. The excellence of the Oregon walnut is beyond question. The gold and silver medals that we have captured, as well as the testimony of dealers who are bidding for our product for their fancy trade, is evidence of its excellent quality. But there are many things that enter in the making of the perfect nut. Even after the tree has cast down its golden shower of the finest product, the gathering, washing and drying makes for the sweetness of the nut. When I see men who make a success in other lines of horticulture and farming pulling out walnut trees because they have planted a cheap lot or are too impatient for the harvest, and others bringing sackfulls of the finest nuts to market, discolored and dirty from having lain on the wet ground for days and weeks, I sometimes think that it is a long, long way to Tipperary.

But my heart's right there, and our association is doing heroic work, although but two years old: we get our committees together two or three times a year, compare notes and crack the whip for another run. Then when we get together in annual convention there is something doing. We cut out the frills and get at once to business. No welcomes by the mayor and response by Colonel Long Bow with a brass band, but rather like the women at the fish market: "Have yees any nice fish, Mrs. Maloney?" "Indade, I have, Mrs. Flanigan." "They stink." "You lie." And that is the way our fight usually starts, only not so vigorously, of course.

We have one committee that is all important and is doing fine work. The committee on seedling varieties is making a survey of the western states to find a variety or varieties best suited to the soil and climate of the different localities. This committee includes the best men available for that work; H. M. Williamson, secretary of our state board of horticulture, chairman; C. I. Lewis, chief of division of horticulture, Corvallis; Leon D. Batchelor, experiment station, Riverside, California; A. A. Quarnberg, grower and experimenter, Vancouver, Washington; E. W. Mathews, extensive planter, Portland, and Charles L. McNary, planter, Salem. Mr. McNary told me yesterday that he had made a survey of thirty-five very fine trees, on blank cards similar to the one enclosed. We expect to have the record of at least 200 trees by the time of our convention. Only those that approach the standard wanted are listed.

To give the product of the walnut crop of the state would only be a wild guess. The system and machinery that we have for finding out how much we raise is only in embryo. The estimates reach all the way from 100,000 to 500,000 pounds. There is a good crop this year and the output for the market is growing rapidly. We need education more than we do growers. But we are learning.

I want to give you some facts of things that I find. Yesterday at the orchard of Alex. Lafollette, State Senator from Marion county, and peach king of the Willamette Valley, I found seven-year-old walnut trees planted in rows among his peach trees, walnut trees planted sixteen feet apart! He said that his trees were full of little walnuts in the spring, but they all dropped off, and he did not think they would do well there. He said there were no catkins on the little trees, which accounts for the failure of his crop. This he did not know. And he did not know that the trees would produce the catkins in a year or so and remedy the failures. In the famous

Dundee orchards I picked up handfuls of little fibrous roots, photo of which I sent you, that had been torn up by the plow and harrow when cultivating the walnut trees. Bales of these roots could be gathered up from the ground under the trees. The owner said that it did the trees good to treat them that way. Another black walnut tree that I visited in a cultivated field of good deep, rich soil, I found walnut roots protruding from the plowed ground as far away as 108 feet from the tree. The tree was thirty or forty years old.

It would add greatly to the walnut industry of the future if the Forest Service would plant black walnuts in the hills and mountains between here and the coast. You know in that burnt timber section and various localities in the coast mountains there are many places where eight or ten nut trees to the acre would soon give a good account of themselves. If properly planted, in five or ten years they could be topgrafted to a good English variety and add greatly to the value of the public domain as well as the food products of the nation. We have no native walnuts, but almost every variety under the sun will grow here.

WESTERN WALNUT ASSOCIATION.

SEEDLING WALNUT TREE RECORD.

No....... Made.......... 191.... by......................

Owner ....

P. O. .... State............ Route............

Exact location ....

NUT — Origin ....

Variety .... planted 1...........

TREE — Origin .... age now............

Transplanted 19......, Dia. trunk.......................

Height .... spread ....

DATES — of budding out ....

catkin blooms .... nut blooms...............

leaves fall .... nuts fall.................

in 1-lb. kernel wt.............. oz. shell wt.............. oz.

NUTS — Per tree....... lbs. In cluster......., in lb........

round, oval, pointed, smooth, not well sealed,

KERNEL — light, dark, not easily removed from shell. Tannin — little excessive.

Tree vigor................. Blight.......... per cent......

PRESENT AT 1916 MEETING

L. H. Ott, 1746 T St., Washington
J. C. Smith, House of Rep. P. O.
Fred. L. Fishback, 609 Union Trust Bldg., Washington
Mr. and Mrs. W. E. Chamberlin, 44 R St., N. E.
Dr. Taylor, U. S. Dept. of Agriculture
Dr. True, U. S. Dept. of Agriculture
Miss F. Cadel, Shepard St., Chevy Chase, Md.
F. S. Holmes, Ag. Ex. Sta., College Park, Md.
Dr. Hassall, Bowie, Md.
M. P. Reed, Vincennes, Ind.
Carl Poll, Danville
Harry R. Weber, Cincinnati
J. Russell Smith, Round Hill
E. B. Crockett, Monroe, Va.
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John Littlepage
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Miss Edna McNaughton, Middleville, Mich.
Mr. C. E. Emig, Washington, D. C.
A. C. Brown, Lanham, Md.

NORTHERN NUT GROWERS ASSOCIATION

REPORT

OF THE PROCEEDINGS AT THE

EIGHTH ANNUAL MEETING

STAMFORD, CONNECTICUT

SEPTEMBER 5 AND 6, 1917

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Letter from John S. Parish, Virginia.

Attendance at the Convention.

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CONSTITUTION

Article I

Name. This society shall be known as the Northern Nut Growers Association.

Article II

Object. Its object shall be the promotion of interest in nut-bearing plants, their products and their culture.

Article III

Membership. Membership in the society shall be open to all persons who desire to further nut culture, without reference to place of residence or nationality, subject to the rules and regulations of the committee on membership.

Article IV

Officers. There shall be a president, a vice-president and a secretary-treasurer, who shall be elected by ballot at the annual meeting; and an executive committee of five persons, of which the president, two last retiring presidents, vice-president and secretary-treasurer shall be members. There shall be a state vice-president from each state, dependency, or country represented in the membership of the association, who shall be appointed by the president.

Article V

Election of Officers. A committee of five members shall be elected at the annual meeting for the purpose of nominating officers for the following year.

Article VI

Meetings. The place and time of the annual meeting shall be selected by the membership in session or, in the event of no selection being made at this time, the executive committee shall choose the place and time for the holding of the annual convention. Such other meetings as may seem desirable may be called by the president and executive committee.

ARTICLE VII

Quorum. Ten members of the association shall constitute a quorum, but must include a majority of the executive committee or two of the three elected officers.

ARTICLE VIII

Amendments. This constitution may be amended by a two-thirds vote of the members present at any annuel meeting, notice of such amendment having been read at the previous annual meeting, or a copy of the proposed amendment having been mailed by any member to each member thirty days before the date of the annual meeting.

BY-LAWS

ARTICLE I

Committees. The association shall appoint standing committees as follows: On membership, on finance, on programme, on press and publication, on nomenclature, on promising seedlings, on hybrids, and an auditing committee. The committee on membership may make recommendations to the association as to the discipline or expulsion of any member.

ARTICLE II

Fees. The fees shall be of two kinds, annual and life. The former shall be two dollars, the latter twenty dollars.

ARTICLE III

Membership. All annual memberships shall begin with the first day of the calendar quarter following the date of joining the association.

ARTICLE IV

Amendments. By-laws may be amended by a two-thirds vote of members present at any annual meeting.

Northern Nut Growers' Association

EIGHTH ANNUAL MEETING

September 5 and 6, 1917

Stamford, Connecticut.

The eighth annual meeting of the Northern Nut Growers' Association was called to order at the Hotel Davenport, Stamford, Connecticut, at 9.30 A. M., the Vice-President, Prof. W. N. Hutt, presiding in the absence of the President, Mr. W. C. Reed.

The meeting opened without formalities with a short business session.

The report of the Secretary was read and adopted as follows:

REPORT OF THE SECRETARY-TREASURER.

Balance on hand date of last report	$ 21.45	
Receipts:		
Dues	255.00	
Advertisements	36.00	
Contributions	15.00	
Sale of reports	26.65	
Contributions for prizes	46.75	
Miscellaneous	.89	
		$401.74
Expenses:		
Printing report	$158.60	
Miscellaneous printing	19.00	
Postage and stationery	45.91	
Stenographer	40.30	
Prizes	57.00	
Litchfield Savings Society	65.00	
		$385.81
Balance on hand		$15.93

Total receipts were a little greater than the year before, receipts from dues a little less. There are several new life members, ten in all now, and the secretary has followed the course adopted some time ago of depositing receipts from life memberships in a savings bank as a contingent fund.

There are 138 paid up members, compared with 154 last year. Fifty members have not paid their dues and there seems to be no other course but to drop them, after repeated notice, though some are old friends.

Four members have resigned and there has been one death, that of Mrs. Charles Miller, of Waterbury, Connecticut.

We have added but 28 new members during the year, while we have lost 55.

There have been 358 members since organization, of whom we still have 138, 220 having dropped out.

Mr. T. P. Littlepage, as chairman of the Committee on Incorporation, reported at some length on the advisability and the possibilities.

On motion of Mr. R. T. Olcott, the question of incorporation was left in the hands of the committee with power.

The following Nominating Committee was elected: Col. Van Duzee, Mr. Weber, Mr. Bixby, Mr. Smith, Mr. Ridgeway.

The following Committee on Resolutions was appointed by the Chair: Dr. Morris, Mr. Bartlett, Mr. Olcott.

Moved by Mr. Littlepage: That the association request the Secretary of Agriculture to include in his estimates of appropriations for the next fiscal year a sum sufficient, in his judgment, to enable the department to carry on a continuous survey of nut culture, including the investigation and study of nut trees throughout the northern states, such nut trees including all the native varieties of nuts, hickories, walnuts, butternuts and any sub-divisions of those varieties, and that a committee of three be appointed to interview the secretary personally to have this amount included in the appropriation.

[Motion carried.]

Mr. Olcott recalled that last year the National Nut Growers' Association secured an appropriation, and he suggested that this would make it easier for the Northern Nut Growers to do so this year.

Mr. Bartlett: It occurred to me that the boy scouts, with their great membership and being often out in the woods, would be valuable to the nut growers' association in hunting native nuts. I took up the matter with Dr. Bigelow of the Agassiz Association, who is also Scout Naturalist and I think he can tell us more about getting the boy scouts interested.

Dr. Bigelow: I would suggest that you enlist also the interest of other organizations for outdoor life. If I knew a little more definitely what is wanted it could be exploited in definite terms in Boys' Life, the official organ of the Boy Scouts of America, which has a mailing list of over 100,000, and which reaches ten or twenty boys each copy. So you have nigh on to 1,000,000 members who would be reached in this way. My predecessor, Mr. Ernest Thompson Seton, has organized the Woodcrafters, which consists of both boys and girls. It seems to me that their service should be enlisted. They have done remarkably good work. And there are other organizations such as the Camp Fire Girls. I would suggest that some of you formulate a resolution and let me have a copy of it to publish in Boys' Life.

Dr. Morris: I will say one word in harmony with Dr. Bigelow and the possibility of enlisting the interest of these organizations. One of our members, I think Mr. Weber, has found on a tributary of the Ohio River a thin shelled black walnut that came down with the flood. He has found two specimens at the mouth of the stream and he knows that this particular thin shelled black walnut grows somewhere up that stream. He would give $50 to anybody who would find that black walnut tree.

I will give five dollars every year to any boy scout who wins any of our prizes. That is a permanent offer. Or I will enlarge it perhaps, after we discuss the matter further by including the Camp Fire Girls. I will add others to that list. I will give five dollars to any member of one of those organizations affiliated with us who wins any nut prize in any year, in addition to our regular prizes. Furthermore we will offer to name any prize nut after the discoverer, so that his or her name will go down in history, perhaps causing much fame.

Dr. Bigelow: I have had my attention called to the fact that in the West the beech trees are heavily laden with nuts. It suddenly dawned on me that in all of my boyhood experience as a hunter and tramper, I had never seen one edible beech nut in Connecticut. I know there are many beech trees around Stamford, but I have not been able to find any nuts. I have advertised for them but although I have received more than a hundred packages from over the rest of the country, I have not seen one single beech nut from Connecticut. Some of the old-timers say they were once plentiful. I wonder whether beech nuts have disappeared from Connecticut as have potato balls.

Dr. Morris: In the lime stone regions they commonly fill well. I have a great many beech trees on my place from one year to more than one hundred years of age, and they came from natural seeding, but the seeds in this part of Connecticut are very small and shrivelled. They are not valuable like the ones in western New York, for instance, and I do not remember even as a boy to have known of eastern beech trees with well-filled nuts. Many of these inferior nuts will sprout, however.

Mr. Littlepage: I think Dr. Bigelow has hit upon a point of a great deal of interest. For example, on my farm in Maryland I think there are perhaps three or four hundred beech trees of various sizes, probably none of them under ten years of age and up to fifty, and in the four years that I have been observing these beech trees, there has never grown upon them a single full, fertile beech nut. I have observed very carefully. On my farm in Indiana I have been observing the same thing for probably ten or twelve years, and I have never seen a single filled beech nut. There are some beech trees there two feet in diameter.

PRESIDENT'S ADDRESS.

W. C. REED, INDIANA.

(Read by the Secretary.)

FELLOW MEMBERS NORTHERN NUT GROWERS' ASSOCIATION,
LADIES AND GENTLEMEN:

Our association convenes today under changed conditions not only in this country but throughout the world. Upon the United States rests the burden of feeding the world, or at least a large portion of it. With seven-tenths of the globe's population at war, surely this is a mammoth undertaking.

The government is urging the farmer to increase his acreage of all leading grain crops, to give them better cultivation, and is guaranteeing him a liberal price.

CROP VALUES.

Crop values have increased until today there is land bringing more than $100.00 per acre for a single wheat crop. Corn has sold above $2.00 per bushel, beans at 20 cents per pound, and hogs at $20.00 per 100 pounds on foot.

LABOR ADVANCES.

With these high prices all along the line the price of labor has advanced to the highest point ever known. Surely it is up to the American farmer to husband his resources by the use of labor-saving machinery, by using the tractor and other power machines to conserve horse feed, by the cultivation of all waste land possible and by practicing economy and thrift.

MORE INTENSIVE AGRICULTURE.

In the more intensive agriculture that is urged upon us the Northern Nut Growers' Association can do a splendid work by the interesting of all land owners in the conservation of the native nut trees and the planting of grafted nut trees in gardens, orchards and yards, to take the place of many worthless shade trees.

HIGHWAY PLANTING.

With the government and states working together in the establishment of market highways and the building of permanent roads, now is the time to urge the planting of trees that will last for this generation and the ones that are to follow. In sections of the country the different kind of nut trees suitable could be selected and, if planted and given proper care, would be a source of large income in the years that are to come.

Community effort is needed for such work and if the members of this association will use their influence it will help to bring this about. There is one county in England where all the roadsides have been planted to Damson plums, which has not only made the landscape more beautiful and furnished the people with much rfuit, but the past season has furnished many tons of plums that were picked half ripe for the manufacture of dyes that had become scarce owing to the war.

If such a movement as this had been taken in this country in the planting of nut trees in former years our roadsides today would be more beautiful, the country more healthy, the farmer more independent, having these side crops that require little labor and that could be marketed at leisure. Our soldier boys might today have sealed cartons of nut meats included in their rations on the European battle fronts that would be very acceptable as food and add little to their burden.

NUT MEATS IN PLACE OF PORK.

If every land owner had enough nut trees to furnish his family with all the nut meats they cared to use, and all the nut bread they would eat, it would go a long way in solving the high cost of pork and beef. The better grafted varieties of the black walnut are specially well adapted for use in nut bread and can be grown in many places where pecans and English walnuts will not succeed so well.

WHAT THIS ASSOCIATION HAS ACCOMPLISHED.

In looking backward over the past eight years since this association was organized it might be well to review some of the things accomplished. When this organization first came into existence there was a small demand for budded and grafted nut trees, but none were to be had in the hardy northern varieties. Interest was created, best individual trees have been located and new varieties introduced. Methods of propagation have been worked out, public opinion has been moulded, government investigation has been fostered, commercial planting of northern nut trees made possible, and today pecans, English walnuts and best varieties of grafted black walnuts may be had in quantity. This association has caused thousands of nut trees to be planted that would otherwise not have been. Some may ask the question, has it paid? Individually I would say it has not, but collectively it has, and will pay large dividends to future generations by making it possible for a larger food supply at a minimum cost.

CARE OF TRANSPLANTED NUT TREES.

It might be well to urge greater care in the cultivation of transplanted nut trees. Trees should be set fall or early spring while perfectly dormant. If bodies are wrapped the first summer and first winter it will prevent much trouble from sun scald. If mounds of earth one foot high are banked around trees before first cold weather it will often prevent bark bursting which may be caused by freezing of the trees when full of sap, caused by late growth. This mound can be removed the next spring and in case of any winter injury you have plenty of fresh healthy wood to produce a top.

Cultivation should commence early in the spring and be kept up until September first. Never allow weeds to grow or ground to become crusted. Nut trees form new rootlets slowly the first summer and require special care. After the second summer they will stand more neglect, but extra cultivation will be rewarded with extra growth at all times.

FINANCES.

In looking over the treasurer's report at Washington I find a balance of $21.45, reported at last meeting under date August 14th, 1917. Treasurer reports balance on hand of $14.13 and no obligations. I think he is to be congratulated on being able to make ends meet and issue the reports.

After going over the budget for the coming year I think that we may be able to keep up this record if the membership committee will look after new members and see that all old members renew their membership promptly.

PLACE OF MEETINGS.

Owing to present war conditions the president would recommend that selection of the next place of meeting be left to executive committee to be fixed later after conditions and crops for next year are better assured. It would seem that some central location might draw the largest attendance and be of greatest benefit to the association for the coming year.

NUT EXHIBITS.

Nut exhibits should be encouraged as much as possible and prizes offered when finances will permit, or where members offer special premiums. This effort will bring out varieties that are worthy of propagation and valuable trees will be saved to posterity. These exhibits can often be held in connection with local horticultural meetings. It is well for our members to keep a watch for such chances.

REASONS FOR OUR LIMITED KNOWLEDGE AS TO WHAT VARIETIES OF NUT TREES TO PLANT.

PROF. W. N. HUTT, NORTH CAROLINA.

Agriculturally this continent is about three centuries old. Horticulturally its experience has scarcely reached the century mark. Practically all the commercial fruit industry of the United States is the product of the last half century. Relatively speaking we are quite young and therefore there are a great many things about nut-growing that we may not be expected to know. In the older lands of Europe and Asia they have a horticultural experience going back from ten to twenty centuries.

In this new country the pioneers had necessarily to confine themselves to the fundamentals and it is to be expected that their horticultural operations were confined to a very narrow maintenance ratio. As the country was cleared up and developed certain sections were found to be especially suited to fruit culture. About these centers specialized fruit-growing industries were developed. These planters tried out all available varieties and dveloped their own methods of culture. As these industries developed horticultural societies were formed for the exchanging of ideas and experiences. In 1847 the American Pomological Society was formed as a national clearing house of horticultural ideas.

The first work the society undertook was to determine the varieties of the different classes of fruits suitable for planting in different sections of the country. Patrick Barry, of Rochester, one of the pioneers of American horticulture was for years the chairman of the committees on varietal adaptation and did an immense amount of work on that line. At the meetings of the society he went alphabetically over the variety lists of fruits and called for reports on each one from growers all over the country. This practice was kept up for years and the resulting data were collated and compiled in the society's reports. In this systematic way the varietal adaptations of the different classes of fruits were accurately worked out for all parts of the country. A similar systematic roll call of classes and varieties of nuts grown by the members of this association would be of immense value to intending planters of nut trees.

In northern nut-growing, however, it may be questioned if we are yet arrived at the Patrick Barry stage. What we need is pioneer planters who have the courage to plant nut trees and take a chance against failure and not wait for others to blaze the trail. It needs men of vision and courage to plant the unknown and look with hope and optimism to the future. So many are deterred from planting by the fact that nut trees are tardy in coming into bearing and uncertain of results. In these stirring times we want men of nerve in the orchard as well as in the trenches. We need tree planters like Prof. Corsan who, at a former meeting of this association when joked about planting hickories, replied that he wasn't nervous and could watch a hickory tree grow. It takes nerve to be an inovator and to plant some radically different crop from what your conservative neighbors all about you are planting.

The Georgia cotton planters wagged their heads and tapped their foreheads when Col. Stuart and Major Bacon turned good cotton land into pecan groves. But the thousands of acres of commercial pecan orchards now surrounding these original plantings showed that these pioneer pecan planters were not lunatics or impractical dreamers, but courageous men of vision, thirty years ahead of their time.

Nut tree planting is not all waiting. It will give the busy man some surprises as I have reason to know from my own limited experience. Ten years ago when I planted my first experimental orchard I set about preparing several other lines of quick maturing experimental work, for I did not expect those trees would have any thing to report for a decade or so. You can imagine how surprised and delighted I was when on the third year there was a sprinkling of nuts, enough to be able to identify the most precocious varieties. The surprise increased to wonder the next year when there was an increased number of nuts on the trees that had borne last year and a number of new varieties came into bearing. In the eighth year when an 800-pound crop of nuts changed that experimental planting into a commercial pecan orchard, I was, to use a sporting phrase, "completely knocked out of the box." The man who thinks there are no thrills in tree planting has something yet to learn. It is the surest sign of a real true-blue horticulturist that he wants to set some kind of new tree or plant.

It is the rarest kind of a plantation that has on it no waste land. Fence rows, ditch banks and rough or stony places are to be found on practically every farm. Such spots too often lie waste or galled or at best are covered with weeds, briars, bushes or useless scrubby trees. These waste places would make a fine trial ground for testing out nut trees. A few fine walnuts, pecans or hickories, or rows of chinquapins and hazels would add profit as well as beauty to these waste and unsightly places found on most farms.

Following old conservative methods the average farmer sets about his house and buildings unproductive oaks, elms and maples, with scarcely a question of a thought that there are as handsome shade trees that will produce pleasure and profit as well. On our lawns and about our door yards we could plant to advantage the Japanese walnut and the hardier types of pecans and Persian walnuts. It would be of interest to try a few seedlings of these classes of nuts. If such practices were followed in the planting of nut trees it would not be long until new and valuable sorts would be found and a great deal of data made available to intending nut planters. I believe that a great deal of good would result from the preparation and dissemination of a circular encouraging farmers in nut planting.

This association is doing a valuable work in offering prizes to locate high class seedling nut trees that will be worthy of propagating. Sooner or later valuable sorts will be found in this way. In this connection it will be wise for this association to solicit the active co-operation of the horticultural workers in the different states. The workers of the agricultural colleges, experiment stations and extension service do a great deal of traveling and have special facilities for getting in touch with promising varieties. The horticulturists of some states have made nut surveys of their states to ascertain their resources in the way of valuable varieties and of conditions suitable for nut culture. The interesting bulletin, "Nut Growing in Maryland," gotten out by Prof. Close, when he was State Horticulturist in Maryland, is a very valuable contribution along this line. It would be well for this association to solicit the co-operation of the trained horticulturists in the northern states to make nut surveys and ascertain definitely the valuable varieties already growing within their borders and what are the possibilities for the production of these types for home purposes for commercial growing. A few of the state experiment stations have taken up definite experimental and demonstration nut projects and are doing valuable work in this line. This association should memorialize the directors of the other stations to undertake definite nut projects and surveys and get the work under way as soon as possible.

While endeavoring to stimulate private, state and national investigations in nut culture, the author would be very remiss if he failed to recognize the very valuable work already done by the zealous, painstaking and unselfish pioneers of northern nut growing. Messrs. Rush and Pomeroy have given to the country and especially to the north and east, two valuable hardy Persian walnuts. Our absent president, Mr. W. C. Reed, of Vincennes, Ind., is doing a great deal in the testing and dissemination of hardy nut trees. Our first president, though an exceedingly busy surgeon and investigator in medicine, finds time to turn his scientific attention to the testing and breeding of nut trees. Some of our brilliant legal friends, too, find time to pursue the elusive phantom of ideal nuts for northern planting.

We cannot go through the growing list of nut investigators nor chronicle their achievements, but we know that when the history of American horticulture is written up ample justice will be done to their labors and attainments. Let each of us do our part in the building up of the country by the planting of nut trees. Let us plant them on our farms, in our gardens and about our buildings and lawns. Let us induce and encourage our neighbors to plant and do all possible to make nut planting fashionable until it becomes an established custom all over the land. It will not then be long before valuable varieties of nut trees will be springing up all over the country. This association will then soon have a wealth of available data at hand to give to intending planters in all parts of the country.

A MEMBER: In Europe they raise a great many nuts that they ship to this country, chestnuts, hazels and Persian walnuts. I understand they grow usually in odd places about the farms, but the aggregate production amounts to a great deal. We could very well follow the lead given by Europe in that particular, at least.

I think we could have for dissemination circulars which would stimulate people to plant nut trees more widely than at present.

THE SECRETARY: This question of nut planting in waste places always comes up at our meetings and is always encouraged by some and frowned upon by others. I do not think we ought to recommend in an unqualified way the planting of nut trees in waste places. I have planted myself, lots of us have tried it, and found that most nut trees planted in waste places are doomed to failure. I do not recall an exception in my own experience. I understand that in Europe the road sides and the fence rows are planted with trees and the farmers get a part of their income in that way. But with us in Connecticut nut planting in waste places does not seem to be a success. It is quite different when you come to plant nut trees about the house and about the barn. They seem to thrive where they don't get competition with native growth and where they have the fertility which is usually to be found about houses and barns. In fact, I have advocated the building of more barns in order that we might have more places for nut trees. I think we should plant nut trees around our houses and barns where we can watch them and keep the native growth from choking them, and where we can give them fertility and keep them free from worms. The worms this year in Connecticut have been terribly destructive. My trees that I go to inspect every two or three weeks, at one inspection would be leafing out, at the next would be defoliated. If such trees are about your house where you can see them every day or two you can catch the worm at its work. So for experimental planting I think places about our houses and barns can be very successfully utilized. When it comes to commercial planting, I think we must recommend for nut trees what we do for peach trees. We must give them the best conditions. I am hoping from year to year that somebody will come forward to make the experiment of planting nut trees in orchard form and give them the best conditions, as he would if he were going to set out an apple or peach orchard. The association has made efforts by means of circulars to interest the experiment stations, schools of forestry and other agricultural organizations. A number of the members of such organizations are members of the association. The work has been taken up to some slight degree in such places as the School of Forestry at Syracuse. I do not recall any others at this moment, although there are some. I will read part of a letter from Professor Record of the Yale School of Forestry: "The only reasons I can think of why the consideration of nut trees is not given more attention in our school are (1) it comes more under the head of horticulture than forestry (2) lack of time in a crowded curriculum (3) unfamiliarity with the subject on the part of the faculty." We would like to interest these faculties in nut growing. We look upon them as sources of education but evidently we are more advanced than they are in the subject of nut growing and it is up to us to educate them.

COL. VAN DUZEE: Right now when you are at the beginning of nut growing in the North you cannot over estimate the value for the future of records. My heart goes out to the man who comes to us as a beginner and wants to know something definite. Our records are the only thing we can safely give him. The behavior of individual nut trees, the desirability of certain varieties for certain localities—those things are of tremendous value.

No doubt you know that in California they have come to the point in many sections where they keep records of what each individual tree does. I began that some years ago with the commercial planting that I have had charge of for the last twelve years. We now have an individual tree record of every nut produced since these trees came into bearing—about 2500 trees. I went further than that—I kept a record of the value of the different nuts for growing nursery stock so that I might grow trees that would be the very best produced in our section. Now the years have gone by and I have a ledger account with every tree in that 2500 and I know exactly what it has given me. I know how many nuts it has produced. You would be surprised to see the wide discrepancy in those records, the different behavior of individual trees. I wish I could talk to you longer on that subject. It is something I am very enthusiastic about.

By virtue of the records we have kept for years I have found a source of supply for seed nuts and nursery stock which has proved to be a constant performer. I bud this nursery stock from trees with individual records that have proved themselves to be good performers. I have found that certain varieties have proved themselves not worthy of being planted, and certain other varieties have proven themselves at least promising. This last year I took 100 Schley, 100 Stuart, 100 Delmas and 100 Moneymaker trees and planted them all on the same land. Now these trees, you understand, are grown from the stock grown from a nut that I know the record of for years. I know its desirability. The buds are from selected trees whose records I have. More than that, I alternated the rows and the trees in the rows. These trees are now where they have got to stand right up and make a record so that we will know ten years from today what is the best variety for our section.

I do not think I can make myself as clear as I wish I could this morning, but here is the point. If anybody comes to me I can tell him definitely, and I have records in my office to show, what the different varieties are doing and what soil they are growing in. Here in the north where the industry is in its infancy now is the time to start records. When I saw the subject of Professor Hutt's paper, the "Reasons For Our Limited Knowledge as to What Varieties of Nut Trees to Plant," it occurred to me that if you don't now start right in making records. ten years from today you will still have existing one of the principal reasons why you don't know.

Mr. Kelsey: I started out four years ago with English walnuts. I read the account of Pomeroy and so I got a half dozen trees from him. They all died. I got five or six trees from Mr. Jones. I think this is the third year and one of those has some nuts on. I have got now about 150 trees planted in regular rows where I am cultivating them. But I was going to say that four years ago I sent to Pomeroy and asked him if he wouldn't send me a few nuts as a sample. He sent me 16. I cracked two of them. Fourteen of them I put in. I didn't know how to put them in so I took a broom handle, punched a hole in the ground and stuck them in the bottom. I never thought I would get any results from them. They came up in July. They did not come up quick. I suppose I had them so deep. I set them out three years ago. Some of them are as high as this room in three years on cultivated land set out in rows. They have never borne any. No one knows how long it takes for a seedling to bear. It may be two years, or five years, or ten.

Dr. Morris: I want to bear witness on the point that Col. Van Duzee made, the matter of keeping records. The man who keeps good records is a public benefactor because what he learns becomes public property upon the basis of available data. Every one of us should pay attention to that point which Col. Van Duzee has brought out. Unfortunately my records have been kept by my secretaries in shorthand notes and I have had four different secretaries in ten years, and each with different methods of shorthand. They have not had time to write up all the notes, and so I find it difficult to present good nut records when busily occupied with professional responsibilities, which must come first. I had one field filled with young hybrid nut trees. A neighbor's cow got into that field and the boy who came after the cow found her to be refractory. The boy began to pull up stakes with tags marking the different trees and threw them at the cow. Before he got through he had hybridized about forty records of nut trees.

The Chairman: As a horticulturist along experimental lines I find the trouble is to get people to plant trees and properly plant them. I do not think that the average farmer knows how to plant trees. That is why they get such poor results. They plant them where anybody with intelligence would not plant them. We find in the South that we can grow trees if there is protection against fire and stock. If fire is kept out and stock is kept from grazing, nature will cover the land with forest trees. I think that will go a long way to getting nut trees. But a man planting something as valuable as a nut tree wants to take a little more pains than that. I have seen Mr. Littlepage's place where he is raising handsome trees, but he has planted crops around each tree and there is plenty of plant food. You can grow trees almost anywhere if you make the conditions favorable. In hedge rows and odd places, if the forest soil is preserved, you can grow almost any kind of a nut tree. These conditions must prevail or we must make them prevail.

Just another point on the matter of home planting. I wouldn't be a very good preacher if I didn't carry out my own practices. Just to show my faith by my works I want to say that I took out every shade tree at home and put a nut tree in its place. Down south were shade is very valuable they said "that man is very foolish to cut down nice elms and maples like that and put nut trees in their place." It did look so then for a while. Now I have some handsome pecans and Persian walnuts and Japanese walnuts, and this year I get my first dividends from a tree five years old. Of course we have taken care to preserve their symmetry, but I think our nut trees come pretty close to being our best shade tree. I will challenge anybody to find a handsomer tree than a well-grown pecan. It is a very stalwart tree with its branches of waving foliage, which is the characteristic of an ideal shade tree, and yet, in addition to that, it produces in the fall magnificent nuts. So the proposition of home planting is one that pays quick dividends on attention given. I think I have convinced my neighbors that it is a good deal better to raise handsome nut trees than poplars. My neighbor planted Carolina poplars at the same time. He was out there the other morning raking up the leaves and that is all he will have to do until Christmas time.

THE DISEASES OF NUT TREES.

S. M. McMurren, Washington, D. C.

Mr. President and Members: It is a source of great regret with me that I cannot report to you some new and horrible disease attacking nut trees. This makes a more interesting talk.

Last year in Washington I talked to you briefly about the Persian walnut blight which we had definitely established as occurring in the East. Last March the National Nut Growers' Association got very busy and so amended the agricultural appropriation bill that all the funds for national nut investigation were spent for pecan investigation, so it left us up in the air for work in the north. We have, however, been able to continue our observations with the Persian walnut blight and there is only one further point to be emphasized and brought out at this time. Those of you who have informed yourselves on this matter know that the serious period of infection on the Pacific Coast is in the spring. It is a blossom blight. During the past two years the period of infection in the East has been in the late summer and it has not been serious on that account. It is well known that in certain dry springs on the Pacific Coast this blight does not occur and those years the growers are assured of good crops. I think that this investigation, and the bulletin which will soon be forthcoming, will not act as a discouragement for those who want to plant Persian walnuts. I think it should not but should rather encourage planting of these nuts. In spite of the presence of this disease on the Pacific Coast the walnut industry has grown to be very profitable, and if it proves that late infection is the rule in the East there is every reason to believe that the disease will not be so serious. That is practically the only walnut disease worthy of attention at present.

The filbert disease is a fungus disease and Dr. Morris and others are authority for the statement that it can be readily controlled by cutting out.

Dr. Morris: I will show this afternoon that it can be controlled in a way.

Dr. McMurren: We in the department have not been in a position to do any work on the hazel blight so far. The hazel blight is interesting in that it illustrates a principle in plant diseases which it is well to know, that most of our serious plant diseases fall in one of two classes; either a native disease on imported plants or an imported disease on native plants. This filbert blight is very slight on native hazels but very serious on imported European hazels. I do not think there is anything more on the filbert disease, but Dr. Morris will have some interesting things to show you this afternoon.

I want to interject a remark here about the business of planting trees for commercial crops along the road sides. There is more to be considered than the mere matter of planting a tree. Insect pests and diseases have to be taken into consideration. There is nothing that an apple orchard planter more hates to see than a tree out of the orchard. It doesn't receive proper attention and is apt to be a source of disease. I believe that wherever the nut industry has been established on an orchard scale it is a matter that should receive careful thought before trees are planted on the road side. When you have an adequate fertilizing department and can give it careful attention the same as trees in the orchard, all right. But they do not as a rule receive it. Roadside planting perhaps sounds very attractive on the surface and is probably a very good plan in some cases, but I think it is open to grave objections where an orchard industry is in the same section.

The Secretary: I am sorry that Mr. C. A. Reed is not here to take up the discussion of the walnut blight, because I think he takes a little more serious view of it than Mr. McMurren.

Mr. McMurren: I know he does.

The Secretary: That is right that Mr. Reed does, and I am glad he is here (Mr. Reed having just entered) to talk it over. Mr. Jones is also here. Mr. Jones is a close observer and has followed it in the field from the beginning. This matter of walnut bacteriosis is a very important one. Here is the walnut industry just in its infancy. We want to know whether this walnut bacteriosis is threatening such propsed industry seriously or not. We know it is a very serious thing in California. Can we safely begin planting English walnut trees or is the question of the seriousness of bacteriosis so serious that we should not plant extensively until we know more about it. Mr. McMurren has been saying a few words about bacteriosis in which he has not given us an impression of seriousness. I think Mr. Reed will give us some remarks on that matter.

Mr. Reed: I do not like to go up against Mr. McMurren. He is the disease man. He is the last word in the government. I am only a second fiddle when it comes to diseases but I must say that I have not a very optimistic feeling over the blight situation. I have been depending very largely on him to give us information.

THE SECRETARY: Where did you find it, Mr. Reed?

MR. REED: Speaking for the East only, for the part of the country that we are directly interested in, I have visited a number of the walnut sections. I think I have tried to reach all of them and in nearly every place that I have been to in the last year or two there has been blight. Several of the orchards that have been most widely advertised have blight, according to Mr. McMurren's identification. I went all the way from Georgia to Northwestern Pennsylvania and Northern New York State last year to be present when the crops were gathered from orchards of those sections, and in one of those orchards, one at North East, Pennsylvania, the crop was what I would call about 65 per cent failure due to blight. The other orchard, one near Rochester, was not badly blighted, but there was a very light crop, not over 10 per cent of a crop, but still there was some blight there. Now, I do not know just what Mr. McMurren has said. I do know that he does not feel very badly alarmed over the blight situation in the East and I would rather hear him talk and Mr. Rush, and Mr. Jones.

MR. BARTLETT: I would like to know what the chief characteristics of the blight are.

MR. MCMURREN: The ordinary late infection in the East begins with a little spot on the husk around the 1st of July, and that merely spreads until just about the time they fall off the tree. When the blight infection strikes it it stains the nut badly. The point I want to make is that you get the nuts anyhow. Mr. Littlepage, do you recall the trees in Georgetown? The blight there is a very late infection. It is not a thing that I can say should be discouraging. Blights are all over, the pear blight, the apple blight, the lettuce blight. If we can make the crop in spite of it I don't see why we should be unduly alarmed. I think there are a good many other factors to be taken into consideration in planting on a large scale and to make the question hinge on the blight is not right. Spraying is of no avail. I don't think the walnut growers should be discouraged because even in California where it is most serious the industry is still profitable.

MR. JONES: Some times the husk worm may spoil the husk and that may be confused with the blight. So far Mr. Rush has had the blight ever since I have known his trees. Last year the blight was more prevalent than this year. This year I estimated the loss in the nuts about 10 per cent. Last year I think it ran one-quarter.

THE SECRETARY: Would those nuts be ruined?

MR. JONES: Some of them would be and some of them not.

THE SECRETARY: One-quarter would be affected by blight and some of those would be good but not all?

MR. JONES: I don't know what proportion. If the nut when taken out of the husk is black, it would not be worth much. You can eat them but they are not marketable.

NOTES ON THE NUT BEARING PINES AND ALLIED CONIFERS.

DR. ROBERT T. MORRIS, NEW YORK

Among the food trees of the world of the nut bearing group the palms with their many species of cocoanuts probably stand first, the pines next, and the chestnuts third in order, so far as food supply for various peoples is concerned. Then come the almonds, walnuts, hazels, hickories and other nut bearing trees, the nuts of which have been somewhat carelessly looked upon as luxuries rather than as an important pantry full of good substantial calories to be turned into human kinetics.

The pines and allied conifers like *Araucaria* and *Podocarpus* will take their respective places in furnishing food supply for us all when the need comes. Such need is already close upon our new vista of war supplies. The squirrels and mice this year will eat thousands of tons of good food that our soldiers would be glad to have. The particular advantage in planting nut bearing pines rests in the fondness of these trees for waste places where little else will grow, and they need less attention perhaps than any other trees of the nut bearing group. For purposes of convenience in description I shall group all of the conifers together under the head of pines in this paper, although in botany the word "Pinus" is confined to generic nomenclature.

Up to the present time we have not even developed our resources to the point of utilizing good grounds very largely for any sort of nut tree plantations. In accordance with the canons of human nature men work hardest, and by preference, with crops which give them small returns for their labor. Riches from easily raised crops go chiefly to the lazy folks who don't like work. On the way to this meeting some of you perhaps noticed near Rye on the west side of the railroad track, a chicken farm on a side hill and a rich bottom land which had been ditched and set out to about three hundred willow trees along the ditch banks. Now if the owner of this property had set out English walnuts in the place of the willows, each tree at the present time, at a low estimate, might be bearing five dollars worth of nuts per year per tree, and I am sure that would be a much larger income than the owner gets from his chickens—an income obtained certainly with much less trouble, because neighbors cannot break in at night and carry off walnut trees of such size. Two or three weeks from the present time you will observe people everywhere in this section of the country raking up leaves from various willows, poplars and maples, when they might quite as well be raking up bushels of nuts of various kinds instead of just leaves.

I presume that the extensive planting of pine trees for food purposes will have to wait until we have advanced to the point of putting other kinds of nut trees upon good ground first. Pines will be employed for the more barren hillsides when the folks of three hundred years from now begin to complain of the high cost of living.

Among some thirty or more species of pine trees which furnish important food supply for various peoples I exhibit nuts from only sixteen species today, because much of the crop comes from Europe and from Asia. I could not obtain a larger variety of specimens on account of the present interest of people in the game which military specialists play wherever industrious nations have saved up enough money to be turned over to their murder experts. In the pine trees we have opportunity for combining beauty and utility. As a group they are mountain lovers preferring localities where the air drainage is particularly good, but many of them will grow thriftily and will fruit well on low grounds. Fine nuts range in character from the rich, sugary, oily and highly nitrogenous nut of the Mexican piñon to the more starchy *bunya bunya* of Australia, as large as a small potato and not much better than a potato, unless it is roasted or boiled. Yet this latter pine is valuable for food purposes and the British Government has reserved one forest of the species thirty miles long and twelve miles wide in which no one is allowed to cut trees.

The nut of the *Araucaria imbricata* has constituted a basis for contention among Indian tribes in Chile for centuries, and perhaps more blood has been shed over the forests of this pine than over any other single source of food supply in the world. We do not know if the *Pinus imbricata* will fruit in the climate and at the latitude of New York, but I know that at least one tree of the species has lived for twenty years on the Palmer estate here in Stamford.

Some of the smaller pine nuts like those of the single-leaved pine, or of the sugar pine, are delicious when cracked and eaten out of hand, but the smaller pine nuts are pounded up by the Indians with a little water and the thick, rich, creamy emulsion like hickory milk when pressed out, is evaporated down to a point where the milk can be kept for a long time without decomposition. In addition to the nuts of the sugar pine, the Indians collect the sugar of dried juice which exudes at points where cuts have been made in the tree for the purpose. Incidentally, the sugar pine is one of our finest American trees anyway. Botanists tell us that it grows to a height of two hundred and seventy-five feet, and travellers say that it reaches three hundred feet. The latter people having actually seen the trees we may know which estimate to accept.

Aside from the beauty of most pines and the majesty of some of them, their utility is not confined to nuts alone. Timber and sap products are very valuable. The sugar pine in the latitude of New York is hardy, but does not grow as rapidly as it does in the West. The same may be said of the Jeffrey bull pine, but I shall show you some thriftier trees of this latter species tomorrow on my property. A very pretty striped nut is that of the *Pinus pinea*. This is the Italian pignolia, and you may buy them in the confectionery stores in this country. They are used as a dessert nut chiefly, but form an important food supply in some parts of Europe. The Swiss stone pine, *Pinus cembra*, is one of the hardy nut pines, fruitful in this vicinity, and the *Pinus Armandi*, the Korean pine and the Lace-bark pine from central China, are hardy and fruitful in this vicinity, to our knowledge.

Two very handsome pine nuts are those of the Digger pine, *Pinus Sabiniana* and the Big-cone pine, *Pinus Coulteri*. Both trees are hardy in this latitude, but I have not been able to locate any which are of bearing age as yet. The nuts have a rich dark brown or nearly black and tan shading. The nut of the Digger pine is very highly prized by the Indians and is larger and better in quality than the nut of the Big-cone pine which looks so much like it.

Nuts of the Torrey pine have been somewhat difficult to secure for planting, because they are esteemed so highly for food purposes that they have been collected rather closely by local people in the small area in which this species is found on our Pacific Coast. It is improbable that the Torrey pine will be hardy much above our most southern states.

We do not advertise dealers in our association as a rule, but Mr. Thomas J. Lane, of Dresher, Pennsylvania, is not likely to make any great fortune from his sale of pine nuts to us. Consequently, I am stating at this point that Mr. Lane has offered to go to the trouble of securing pine nuts from different parts of the world for our members who wish to plant different species experimentally. I have given him a list of species to be kept permanently on file, and the list is marked in such a way that ones which are known to be hardy, semi-hardy, or fruitful in the latitude of New York may be selected for experimental planting. I hope that some of our southern planters will plant South American, Asiatic, African and Australian species of nut pines for purposes of observation. Mr. Lane will get the seed for them.

I have included among the specimens here today nuts of the ginkgo because that tree belongs among the conifers in natural order. It is an ancient tree which should not fit into this time and generation, but it has gone on down past the day when it belonged on earth. Its prehistoric enemies have died out, so the ginkgo tree has come rolling along down the centuries without enemies and at the same time with many peculiarities. Comparatively few of the trees are females, but the tree grows heartily in this latitude and one may graft male ginkgos in any quantity from some one female. The nut of this tree is rather too resinous to suit the American palate, but the Chinese and Japanese visitors to the Capitol grounds at Washington greedily collect the nuts from a bearing female tree growing there.

Most of the pine nuts have a resinous flavor, but as a class they are so rich and sweet that this is not disagreeable. The nuts of the single-leaf pine and our common piñon, *Pinus edulis*, are delicious when eaten out of hand and both of these trees are hardy in this latitude, but they do not grow as rapidly here as they do upon the arid mountains and under the conditions of their native habitat.

In Europe and Asia pine nuts for the market are cracked by machinery or by cheap hand labor, and I presume that we may eventually hull some of the smaller ones as buckwheat is hulled. If the contents of the smaller nuts are extracted by the Indian method of grinding them up with a little water and then subjecting them to pressure, the waste residue will probably be valuable for stock food of the future, very much as we now use oil cake.

When planting nuts of pine trees I would call the attention of horticulturists to one very important point. The nuts must be planted in ground that does not "heave" in the spring time when the frost goes out. Many of the pine nuts send down a rather slender root at first without many side rootlets, and when the frost opens the ground in the spring the young trees are thrown out and lost. Here is another point of practical importance. Do not plant pine seed where stock can get at the young shoots in March. The little gems look so bright and green, so fresh and attractive when the snow goes off that cows and sheep, deer, squirrels and field mice will all try to collect them. Young pines should be grown in half shade during their first two years. They will require weeding and nice attention on the part of a lover who wishes to be polite to them.

Question: Is there any difficulty in harvesting the crops. do the cones shed?

Answers With some species the cones are shed before they are fully opened. They are collected and stored until the nuts can be beaten out. Other species retain the cones until the nuts have been shed. The branches are shaken and the nuts collected from tree to tree by the beaters and spread out upon the ground.

Sometimes coarse sheeting or matting is carried from tree to tree by the beaters and spread out upon the ground.

Question: At what age will they bear?

Answer: Pines bear rather late as a rule. I doubt if very many of them will bear in less than 10 years from seed.

Question: Would it be possible to produce grafted trees?

Answer: Yes, without much difficulty. Undoubtedly you could get bearing wood from old trees and graft on young trees, or graft on other species. They may be grafted back and forth like the ornamental firs and spruces of the nurserymen.

Question: They don't compass, do they. If you cut them off, do shoots come out of the stumps?

Answer: Not as a rule. Adventitious buds belong to few pine trees. They graft conifers when the stocks are young.

Question: Of those that you suggest, what would be the best here?

Answer: The Korean, the Bungeana or lace-bark, the Swiss stone pine, and the Armandi. These can be counted on to bear in the vicinity of New York. Several other species not yet tried out may bear well here, but I have not gone over the trees on estates very extensively as yet with that question in mind.

Question: Are any of these specially good for the South?

ANSWER: Yes, most of the pine nuts that I have shown here will grow south of Maryland and seven of the best pine nuts in the world belong to our Southwest.

QUESTION: Is there any more trouble with the cows and squirrels over nut pines than there is with ordinary pine trees?

ANSWER: No, excepting that you don't miss the ordinary kinds so much. It is largely a matter of comparative interest.

NOTES TAKEN ON AN EXCURSION TO MERRIBROOKE, THE COUNTRY PLACE OF DR. ROBERT T. MORRIS, AT STAMFORD, CONN., SEPTEMBER 5, 1917.

DR. MORRIS CONDUCTING THE PARTY.

(1) Taylor shag-bark hickory tree, overhanging the entrance gate. A tree remarkable for annual bearing and for nuts of high quality, thin shell, large size, and excellent cleavage. Among hundreds of hickories examined, many of them in response to prize offers, this tree at the entrance furnishes one of the very best nuts of the lot.

(2) Buckley hickory (*Hicoria Buckleyi*) from Texas. Supposed not to be hardy in this latitude. Perfectly hardy, but not growing as rapidly as it does at home. Very large roundish thick shelled nut with a kernel of good quality if you can get it. Kernel has a peculiar but agreeable fragrance.

(3) Another southern species, the North Carolina hickory (*Hicoria Carolinae-septentrionalis*). Note the small, pointed, dark colored buds and beautiful foliage. The tree is perfectly hardy in Connecticut. This shagbark bears a small thin shelled nut of high quality and it will be particularly desirable for table purposes. The tree grows thriftly in Connecticut.

(4) Carolina hickory. Grafted on native shag-bark.

(5) A group of Korean nut pines (*Pinus Koraensis*). Raised from seed and now six years of age. One of the valuable food supply pines of northern Asia. Like most eastern Asiatic trees the species does well in eastern North America.

(6) A central Asian prune (*Prunus Armeniaca*). Without value for the fleshy part of the drupe, but with a nut like that of the apricot, highly prized for its kernel. The tree is hardy and thrifty, but rather vulnerable to a variety of blights belonging to Prunus.

(7) An ordinary black walnut grafted to the Lutz variety. A very large nut with good cleavage, good color and good quality.

(8) Alder-leaved chestnut (*Castanea alnifolia*) from central Georgia. One of the most beautiful of the American chestnuts, with more or less of the trailing habit, running over the ground like the juniper, and apparently not subject to blight. In Georgia it is an evergreen, but in Connecticut it is deciduous, although sometimes a few green leaves are found in the early spring if they have been covered by snow or by loose dead leaves during the winter. The nut is of high quality and fair size. There are a number of hybrids between this and other chestnuts at Merribrooke, but not bearing as yet.

(9) A group of common papaws (*Asimina triloba*), two of them grafted. The Journal of Heredity offered a prize of fifty dollars for the best American papaw, and the prize was awarded to the Ketter variety, the fruits of which weigh about one pound each. Seven little trees of this species were secured and two larger papaw trees grafted from cuttings when the seven were set out. Papaws grow well in this part of Connecticut, and because of the high quality of the fruit should be more largely planted.

(10) Mills persimmon. One of a group of several varieties that are being cultivated in this country. Hardy and thrifty in Connecticut.

(11) A group of Jeffrey bull pines (*Pinus Jeffreyi*) from Colorado. One of the nut pines. Supposed to do its best in the arid mountains of the West. Perfectly hardy and thrifty with beautiful bluish-green foliage in Connecticut.

(12) Himalayan white pine (*Pinus excelsa*). One of the nut pines and with remarkably handsome foliage.

(13) A group of Chinese pistache nut trees (*Pistacia sinensis*). At Merribrooke it has the habit of frequently growing twice in one year and sometimes three times in one year. The shoots will grow a foot or more and then make resting buts early in July. After about ten days of resting the buds burst, new shoots grow again and rest for the second time in the early part of September. If we have a warm moist fall the buds burst for the third time and make a third growth. This third growth winter-kills without injury to the tree, however. The significance of the growth presumably relates to the tree being an inhabitant of an arid country, where it has adapted itself to the rainfall of that country. I do not know if the trunk adds a new ring of wood after each resting period, but it likely enough does so.

(14) Moneymaker pecan. Perfectly hardy and thrifty. It has not borne as yet and there may be a question of the season being long enough for ripening the nut. At the left a Stuart pecan that comes from the very borders of the Gulf of Mexico. Sometimes the smaller branches winter-kill badly and at other times they do not. It is remarkable that a tree from the shores of the Gulf of Mexico should live here at all in the winter.

(15) A field of six-year-old trees. Most of them the result of placing bitternut hickory pollen on staminate butternut flowers. The trees have not borne as yet and we can not tell if they are true hybrids or parthenogens. Parthenogenesis occurs readily with many nut trees. Pollen of an allied species which does not fuse with the female cell to make a gamete may, nevertheless, excite a female cell into division and the development of a tree. Such a tree would be expected to show intensified characteristics belonging to the parent. This lot of trees notable for the fact that some are very small for their age and some very large.

(16) A group of Japanese chestnuts. They blight and die and blight and live and are not given much attention as they are of little value anyway. The chestnut blight (*Endothia parasitica*) attacks the Japanese chestnut about as freely as it does the American chestnut. The trees do not die from it quite so quickly and may bear for some years before dying.

(17) A group of Japanese persimmons in a protected corner of a west-facing side hill. Most of the Japanese persimmons are not hardy in Connecticut, but an occasional variety given a moderate degree of protection will manage to live pretty well. They are uncertain trees, however, as two of the trees grafted to Bennett Japaneses persimmons from Newark, N. J., had two-year-old shoots winter-killed this year. These were on low ground. I shall put my other Bennetts on hill hides.

(18) American sweet chestnut grafted upon Japanese stock. Ordinarily Asiatic and American chestnuts do not make very satisfactory exchange stocks. In this case the American chestnut happens to be doing very well. The variety is known as the Merribrooke. Among the many thousands of chestnut trees here when I bought the place this one bore the best nut of all, very large and of high quality, and beautifully striped with alternate longitudinal stripes of dark and light chestnut color. The parent tree was one of the very first to go down with the blight ten years ago, and the standing dead trunk was removed at the time when I cut out five thousand dead or dying chestnut trees. Stump sprouts of the Merribrooke variety survived for grafting purposes, and I have

now kept the variety going by patient grafting ever since, on new stocks, hoping to carry the variety along until this epidemic of blight runs out of its protoplasmic energy.

(19) Ordinary Japanese chestnut. With fairly good crop of large nuts, but not of good quality, except for cooking purposes.

(20) A group of hybrids resulting from placing the pollen of the Siebold Japanese walnut upon the pistillate flowers of our butternut. The young trees have not borne as yet.

(21) Hybrids between the common American hazel and the European purple hazel. There are a number of these hybrids, and none of them with nuts better than those of either parent, consequently I give them little attention. Some of the hybrids, not as yet bearing, may prove to be more valuable. We have to make lots of hybrids in order to get a small percentage of important ones. In this particular lot the hybrid has taken on a habit of the mother parent, the common American hazel, growing long stoloniferous roots, an undesirable feature.

(22) The Golden Gem persimmon, laden with fruit. Grafted upon the stock of a staminate common persimmon.

(23) Early Golden persimmon. Bearing heavily, a variety grafted upon common persimmon stock.

(24) A group of Chinese chestnut trees (*Castanea mollissima*). Very beautiful trees, worthy of a position on almost any lawn, the foliage is bright and shining, and the thrifty growth very attractive. The species is practically immune to blight, sometimes at a point of injury bark blight will appear, but it spreads very slowly, is easily cut out and does not reappear at that point. It will be a success in Connecticut. The nut is not quite up to our native chestnut in quality, but it is larger in size and a first rate nut on the whole. The tree comes from the original home of the blight, and the two plants having lived together for ages the law of survival of the fittest has given us this chestnut tree, which can largely take the place of our lost American chestnut. The tree does not grow to be quite so large as our chestnut, but I am making hybrids between this species and three species of American chestnuts, and may find some remarkable ones eventually.

(25) Two young nut pines with lost labels. I shall probably not be able to determine the species until they bear cones.

(26) A number of black walnut trees grafted with several varieties of English walnut (*Juglans regia*). There is particular advantage in grafting English walnut upon black walnut stock for the reason that mice are extremely destructive to English

walnut roots in winter time. Furthermore black walnuts will grow in soil that is distinctly acid in reaction, while the English walnut demands a neutral or alkaline soil. The nearest tree of this group had new shoots of the Rush English walnut nearly six feet long, which blew off last week in a wind storm because they had not been braced sufficiently. It is very important when grafting nut trees to fasten strong bracing sticks alongside of vigorous shoots and tying them with sisal tarred cord, which holds good for two years.

(27) Appomattox pecan, Busseron pecan, and Major pecan. All three trees growing very thriftily and all set nuts this spring, but did not hold them. This is the habit of young hickories and walnuts rather largely. None of my pecan trees are old enough as yet to fruit well. I do not know what varieties will find our season long enough for ripening purposes. That particular feature of pecan raising is quite as important as the mere question of hardiness in Connecticut.

(28) A little old butternut tree by my garden. This has been the mother of practically all my hybrids between butternuts and other species of walnuts. This little old tree bears flowers every year and is very conveniently situated for hybridizing work.

(29) An English walnut tree near the garden gate is growing thriftily, making sometimes four feet in a year, but as a seedling has not borne as yet.

(30) Pecan seedling with buds of Busseron recently inserted. They are fastened in place with waxed muslin and then painted with ordinary white paint. I use that a great deal in place of grafting wax, but make the paint thick and heavy so that little free oil runs in between the cambium layers when grafting or budding. Paint seems to be harder and better than liquid grafting wax if it has no free oil.

(31) A rapidly growing Chinese walnut (*Juglans sinensis*). Very much like *Juglans regia*. The nuts have prominent sutures and the kernel is rather more oily than that of the English walnut, but of very good quality, nevertheless.

(32) A number of hickory trees of different species grafted by my favorite method, unless we call it "budding." I call it "the slice graft," and have not known any one else to try it. A slice of bark from one inch to four inches in length is removed from the stock and this area is fitted with a slice of about the same length and breadth, carrying a bud or spur cut from the guest variety. On one of these young hickories you observe I made three slice grafts and all of them have taken with a very thrifty growth

of the Taylor variety. One point of importance, I believe, is to have the slice from the guest variety a trifle smaller than the slice from the host stock. The guest slice is bound firmly to the host with waxed muslin.

(33) Paragon chestnut heavily loaded with burs. This particular tree is said to belong to a variety that is much advertised, but there is some question if it is a peculiar variety of the Paragon, because Mr. Engel, of Pennsylvania, is said to have furnished his own Paragon chestnut scions when the other people were short of stock. If the nursery firm that has put out this Paragon chestnut on the market with so much vigor and at such expense had been a little more frank everybody would have profited. They have made a point of advertising the Paragon chestnut as blight resistant, which it is not; consequently, the country is full of disappointed customers. The dealers should have said something more or less as follows: "This chestnut blights freely, but it bears so well and so abundantly and with such a good nut that people can afford to plant it in large acreage and let it blight, carrying it along with about the degree of attention that one would naturally give to good apple trees." Had the dealers only said something like that, the members of our Association who receive very many letters from all over the country asking about this particular chestnut would have advised its purchase in large quantities. Prospective customers are shy of nurserymen in general. They write to members of our Association asking who is reliable. People have learned what we stand for.

(34) A hybrid between a pecan and a bitternut hickory. A large handsome thin shelled nut, but bitter. The great vigor of growth of the seedlings of this hybrid, which comes from Mr. G. M. Brown, of Van Buren, Ark., would seem to make this hybrid variety of remarkable value as grafting stock for other hickories. The nuts are exceptional in carrying the type form of progeny.

(35) Two rows of many species of nut trees planted in thick glazed earthenware pots. The pots are about four feet in depth and with round perforations. I had these made to order. I sunk them in the ground to the level of the rim and then planted these trees in the pots under the impression that they would remain dwarfed on account of the confinement of the roots, and that I would have a conveniently placed series for experiments in hybridization. The experiment was not a success. I knew that growing trees would move rocks, but had no idea that roots protruding through these holes in heavy glazed earthenware would be able to break the pots. The roots have done just that, and whenever a tree in a pot be-

comes large enough the protruding roots break the pot to pieces, and the tree marches straight along to its original destiny.

(36) One of a group of European chestnuts from seed brought me by Major L. L. Seaman. The parent tree is famous in England for its enormous size and heavy bearing; it is said to be centuries of age and is growing upon the estate of Sir George B. Hingley, Droitwich, Worcestershire, England. My young trees are growing very thriftily. They are showing some blight spots, but this has been controlled by cutting out and painting.

(37) A group of vigorous young trees, the result of placing pecan pollen on the pistillate trees of Siebold walnut. They show the Siebold parentage so distinctly that I imagine them to be parthenogens, but we cannot tell to a certainty until they bear fruit.

(38) A hillside set out with a large number of common bush chinkapins from the East, tree chinkapins from Missouri and a number of hybrids. The chinkapins and the alder-leaved chestnuts on this side hill have been so blight resistant as to require almost no attention, and for that reason I am making hybrids between the chinkapin and the alder-leaved chestnut and the Chinese chestnut in the hope of making an excellent combination of chinkapin quality and Chinese size. Up to the present time none of my hybrids have been as valuable as either parent, with the exception of two. Two of the hybrids bear nuts about the size of the average American sweet chestnut and of first rate quality. These two hybrid trees have shown no sign of blight as yet.

(40) A hybrid between an American chestnut and a chinkapin. It blights freely like its American parent. Some of the hybrids do that while others show the resistance of the chinkapin parent. This particular tree grows lustily, and I have taken the trouble to cut out the blight every year. The leaves and general appearance are very closely like the common American chestnut. When it first began to bear, the nuts were of the chinkapin type, a single nut to the bur and hardly to be distinguished from other chinkapins. A year or two later the nuts changed in appearance, becoming distinctly lighter in color and with peculiar longitudinal corrugations of the shell. A year or so later still the tree made another change, and it now bears two or three nuts to the bur like the American chestnut, the nuts retain their light color and peculiar corrugation.

(41) A group of European hazels (*Corylus avellana*). Several years ago the Prince of Colloredo-Mannsfeld was visiting Merribrooke. His Highness was much interested in the experimental work in nut trees and later sent me a number of hazel nuts from

one of his estates in Bohemia. Among the hazel bushes which grew from these nuts there was one which bore large, long, thin-shelled nuts of high quality. This bush, as you observe, has rather small dark leaves and stout, crooked branches. At one of the meetings of the Association I spoke of the bush as having a bony look, and Prof. J. Russell Smith referred to it in discussion as the "Bony Bush" hazel, and that name has been retained. I have grafted a number of other American and European hazels from this bush and I have sent scions to friends.

(42) A Cook shagbark hickory from Moscow, Ky., grafted upon bitternut stock. This variety bears a very large thin-shelled, irregular nut, with rather poor cleavage, but the quality of the kernel is of such distinct value that I prize the variety.

(43) An example of the spur graft. A common T cut is made in the bark of the stock and then a slice of guest bark carrying a small branch or spur is inserted. In this particular case I put in a branch about ten inches in length and you see that it is growing very well.

(44) My beautiful Merribrooke chestnut grafted upon an ordinary American chestnut stock growing by the roadside. Five years ago I noticed this little chestnut tree growing by the roadside with two stems. One of the stems was blighted and I cut it off and stopped the blight for the time being. The following year the other stem blighted and I trimmed out the blight and sprayed the stem with pyrox. In the following year I grafted the stock, but blight appeared at another point, the blight was cut out, and the stem again sprayed. In the following year blight appeared again, but at another point, and after cutting it out I put on tanglefoot, simply because I happened to have some with me when passing the tree. This year the stem has blighted again and I have cut out the blight and sprayed it, and I shall now whitewash a large part of the stock with whitewash containing a little carbolineum. The graft now in its third year is bearing one big bur. The interesting point is that this tree has blighted every year for five years, and I have kept it going along by giving it attention. This means if we are willing to take the trouble we can get the best of the blight, even with such a remarkably vulnerable tree as this one proves to be.

(45) A barren hillside covered with very handsome red pines eleven years of age, some of them grow nearly two feet per year. The soil is sandy and gravelly glacial till which will raise little else beside feather grass and sumac. The red pines are not nut pines, and attention is called to them incidentally because of their value for growing upon this sort of soil.

(46) A Korean chestnut filled with burs. The Korean chestnut does not blight quite so readily as the American chestnut, and certain individuals are fairly blight resistant. I raised several hundreds of them, but almost all of them are dead. A fairly large number are growing well and bearing without much attention. The nut is pretty good, but coarser than that of the American chestnut.

(47) A group of Tamba chestnuts from Japan. This is the favorite chestnut of the Japanese. I secured a number of the nuts, sprouted them and planted them out here in rows, intending to transplant them to permanent sites later. Finding that they were going to blight badly, I have neglected them and have allowed them to stand. One little tree among them bore a single bur at eighteen months of age and has borne steadily ever since with a heavy crop this year. This particular tree has not blighted, but its nut is coarse and of ltttle value.

(48) When collecting walnuts I obtained a lot of nuts from a correspondent from the Mogollon Mountains in Arizona. The nut resembles that of *Juglans rupestris*, but is larger and thicker shelled. No one knows whether it is an undescribed species or only a distinct variety of *Juglans rupestris*. Several of the nuts sprouted, but various accidents happened to them and this tree now, seven years old, is the only one of the lot living. It looks very different from any American walnut I have ever seen. In fact, it looks so much like a stunted heart nut that I suspected that one of these nuts might have gotten into the lot by accident. In digging down about the stem, however, I found only the shells of a Mogollon walnut. We can not tell what the tree will bring forth, as it is not bearing as yet.

(49) Two groups of chestnut trees of the McFarland variety, about eighteen years of age. They grow and blight and bear, but have not blighted to the point of killing altogether. They have been neglected because the nut has not much value.

(50) A group of Merribrooke hazels. Some years ago I devoted several weeks to examining hundreds of hazel bushes in this part of the country, where they are a pest, and I also visited other hazel localities at a distance. Among all the bushes examined the best nut was found on my own property and I learned later that this particular bush had been known among the boys of the locality for a century. The nut is of large size for an American hazel, thin shelled, of high quality. This group consists of transplants of root progeny from the parent bush.

(51) A Horn hazel (*Corylus cornuta*, commonly wrongly designated as *Corylus rostrata*). A species fairly abundant in Connec-

ticut, and I transplanted these bushes because they happened to have a tremendously long involucre. The nut of the horn hazel is not of such good quality as that of the common American hazel, and I have not succeeded in making hybrids between this and other hazels as yet. The hazels are very ancient in descent and each species likes to retain particular identity.

(52) A number of stocks of red birch, white birch and scrub oak grafted with European hazels and chinkapins, but the grafts all died. The grafting was done as an experiment in the hope that we might possibly utilize our waste lands which are covered with birch and scrub oak by grafting these trees with hazels and chinkapins. Some of the grafts lived for such a long time and put out such long shoots that the experiment will be tried again next year. It would not seem worth while, excepting for the fact that it was a bad spring for grafting anyway, and hazels did not even catch on hazels, though they caught freely last year. The Japanese do grafting on stocks widely different from the scions, but we have not developed that particular feature in this country as yet.

(53) Asiatic tree hazels (*Corylus colurna*). This species makes a tree as large as the common oaks and bears heavily. The nut is about the size of that of the common American hazel. The tree is very beautiful, and I am using it for grafting stock and for hybridizing.

(54) Sprouting cages. A double row of galvanized wire cages sunk four inches into the ground and about four inches free above ground, filled with sandy loam and used for sprouting any nuts which are to be employed in experimental work. Each cage is fitted with a cover of galvanized wire, the purpose of which is to keep out rodents which are so destructive to planted nuts. In these cages there are now a large number of hybrid nut trees growing, and they will be transplanted to permanent sites or to the garden for culture next spring.

(55) Japanese heart nut (*Juglans cordiformis*). The tree is supposed by some botanists to be a form of the Siebold walnut, but it has quite a different appearance. It has an open habit with large leaves and nuts which are suggestive of the conventional heart. The quality of the nut is very good, much like that of the Siebold, but the nut is larger and compressed. The tree is very hardy and is almost tropical in appearance. It has not been planted very largely in this county, but it undoubtedly will be eventually.

(56) Siberian walnut. The tree looks much like the Siebold walnut in general appearance, but with smaller leaflets, and the nut is very much like our butternut, but smaller and with much rougher shell.

(57) Two pecan trees that I bought from a nursery about twelve years ago. They have not borne as yet and being seedlings we cannot know if they will be of value. I shall probably graft them next year and not wait for them to bear their own nuts.

(58) Two large Siebold walnuts only twelve years of age, but growing in rich ground and sometimes making five feet of growth in a single year. They were well filled with nuts two weeks ago, but the red squirrels have cut down all of the nuts including numbers which I hybridized with English walnut pollen this spring. On one of the lower branches of one of the Siebold walnuts is a long thrifty graft of the Lutz black walnut that I put in this spring, simply because I happened to cut off the lower branches of the Siebold that were shading the garden, and I happened to have some of the black walnut scions with me at the time. It will not be allowed to remain on this tree.

(59) A cross between our Siebold walnut and our butternut, now about eight years old, but growing thriftily. It has not borne nuts as yet. I have a number of these trees and they appear to be good hybrids.

(60) A group of Kaghazi Persian walnuts. A valuable variety and one of the so-called English walnuts, a term that we use for convenience because the name has become established in this country by the market men, not by the botanists.

(61) A thrifty young Chinese seedling persimmon (*Diospyrus lotus*).

(62) Little trees of one of the nut pines (*Pinus edulis*). They are at their best in the arid mountains of Arizona, and the species is very important as furnishing a food supply for the Indians. The little trees are hardy here in dry soil among the rocks, but do not grow rapidly. Mine have been in more than six years and are not more than six inches in height, but are very pretty.

(63) The Chinese Tamopan persimmon. The tree is very handsome, with large glossy leaves, but somewhat tender in Connecticut and requiring protected exposure. The fruit of the Tamopan is as large as a very large apple.

(64) Several trees five years of age, the result of English walnut pollen on Siebold walnut pistillate flowers. The trees are growing very thriftily, but they show the Siebold characteristic without much evidence of the English walnut parentage.

(65) A field of Pomeroy English walnuts, notable for their beautiful white bark. The trees have been in over eight years and set nuts for the first time this year. As seedling trees we cannot tell what they will do when in full bearing.

(66) Two species of nut bearing pines from which the marking labels have become lost, and I shall not be able to determine the species until they bear cones. One of them is very beautiful, with long leaves and pleasing bluish green foliage.

A VISIT TO THE ESTATE OF THE LATE LOWELL M. PALMER, NOTABLE FOR ITS COLLECTION OF TREES AND SHRUBS, DR. MORRIS CONDUCTING.

Here we see the Ginkgo trees, two of them bearing. The Ginkgo belongs by descent to the coniferous tree group. A very fine tree with nuts that are highly prized by the Asiatics, but somewhat too resinous for the American palate. Most of the Ginkgo trees are males, but one may graft any number of males with bearing female scions.

An *Araucaria imbricata* grew for twenty years on this place, and we have only just learned that it died last year. This pine is one of the most important of the nut pines and furnishes a large food supply in South America. The fact that one tree lived for twenty years in this latitude means a great deal.

A number of European hazel bushes are growing on the property and bearing heavily. A large heart nut tree, but bearing small nuts, is growing well. Several of the Himalayan nut pines (*Pinus excelsa*) beautify the property, and one of the trees, heavily laden with cones, is at least fifty years of age. Another one of the nut-bearing pines (*Pinus paviflora*, from Japan) is represented by several specimens on the Palmer property, and one little tree apparently less than ten years of age, is heavily loaded with cones. Incidentally we may examine here a trifoliate orange filled with fruit. It is growing in a well protected corner of the grounds. Mr. Webber sent some valuable trifoliate hybrids to Merribrooke. One variety lived through the winter, but made a crippled start in the spring. Some day we may have good trifoliate orange hybrids in Connecticut if the Buckley hickory, Stuart pecan, Arizona walnut and imbricated pine grow here.

A dinner was held at the Hotel Davenport on the evening of the 5th, at which about thirty-five members and guests were present. After dinner the public was admitted and the following papers were read, Mr. Collingwood being a guest of the Association:

Dr. Kellogg: I feel a great interest in the work of this Association and a great sympathy with it. I feel that you are all working for me and I am doing what I can to promote your interests also. That is, I am trying to create a market for your products.

ADVENT OF NUTS INTO THE NATION'S LIST OF STAPLE FOODS.

Dr. J. H. Kellogg, Michigan.

In these days when a condition of food shortage exists in the greater part of the civilized world, any question which concerns a nation's food supply is of public interest.

Food conservation is the great question of the hour. Visions of vanishing steaks and chops alarm the overfed and rising prices of all foodstuffs pinch the bills of fare of the poor.

It may easily be shown that most of all the hardships which the civilized world is suffering as regards food supply is due to lack of understanding and of foresight.

The fundamental error is the popular faith in the high protein ration. The physiologists are at least partly at fault. Liebig's dictum, which made protein the essential food factor in supporting work, has misled the whole civilized world for more than half a century. The dietaries of institutions, armies, whole nations have been based upon a conception which modern science has shown to be utterly false, and the result has been an economic loss which staggers belief, and a destruction of human life and efficiency which overshadows every other malign influence.

To properly appreciate the place of nuts in the national dietary we must have in mind a clear conception of the nature of food as revealed to us in the light of modern laboratory studies of human nutrition and metabolism.

Food is to an animal what soil is to a plant. It is the soil out of which we grew. What we eat today is walking around and talking tomorrow. The most marvelous of miracles is the transmutation of common foodstuffs into men and women, the transfiguration of bread, potatoes and beefsteak into human intelligence, grace, beauty and noble action. We read in holy writ how the wandering Israelites were abundantly fed in the Assyrian desert with manna from the skies and marvel at the Providence which saved a million souls from death, forgetting that every harvest is a repetition of the same miracle, that each morsel of food we eat is a gift of Heaven conveyed to us by a sunbeam. Food is simply sunshine captured by the chlorophyll of plants and served up to us in tiny bundles called molecules, which, when torn apart in our bodies by the processes of digestion and assimilation release the captured energy which warms us with heat brought from the sun and shines out in human thought and action.

It is less than a century since Liebig and Lehmann and their pupils began to unravel the mystery of food. In recent years no subject has received more assiduous attention from scientific men, and none has been made the object of more constant or more profound research than the questions of food and food supply. The feeding of animals and men is without question the most pressing and vital of all economic problems.

The labors of Voit and Pettenkofer, Rubner, Zuntz, Atwater, Benedict, Chittenden, Mendel, Lusk and Hindhede have demonstrated that there is the closest relation between food supply or food selection and human efficiency. In fact, it has been clearly shown that the quality of the food intake is just as directly and as closely related to the question of human efficiency as is the quality and quantity of gasoline to the efficiency of an automobile.

In fact it has been established as a fundamental principle in human physiology that food is fuel. Life is a combustion process.

The human body is a machine which may be likened to a locomotive—it is a self-controlling, self-supporting, self-repairing mechanism. As the locomotive rushes along the iron road, pulling after it a thousand-ton cargo of produce or manufactured wares or human freight sufficient to start a town or stock a political convention its enormous expenditure of energy is maintained by the burning of coal from the tender which is replenished at every stopping place. The snorting monster at the head of the rushing procession gets hungry and has to have a lunch every few miles along the way. After a run of a hundred miles or so the engine leaves the train and goes into a roundhouse for repairs; an iron belt has dropped out or a brass nut has been shaken off. Every lost or damaged part of the metal leviathan is replaced, and then it is ready for another century run.

The human body is wonderfully like the locomotive. It pulls or carries loads, it expends energy, it consumes fuel and has to stop at meal stations to coal up; it has to go off duty periodically for repairs. The body needs just what the locomotive needs—fuel to furnish energy and material for repair of the machinery.

Food differs from fuel chiefly in the one particular, that in each little packet of food done up by Mother Nature there is placed along with the fuel for burning a tiny bit of material to be used for repair of the machine. In other words, food represents in its composition both the coal and the metal repair materials of the locomotive. The starch, sugar and fat of foods are the coal and the protein or albumin is the metal repair stuff. Here we see at once the reason why starch and sugar and fat are so abundant in our foodstuffs, while protein or albumin is in quantity a minor element.

But there are other differences between food and common fuel which are worthy of mention. The water and the salts are essential to meet the body's needs, especially the various mineral elements, lime. soda. potash and iron. All these we must have—lime for the bones and nerves, soda and potash to neutralize the harmful acid products of combustion processes, and iron for the blood.

All these are found in normal foodstuffs, but in greatly varying proportions, so that a pretty large variety of foods must be eaten to make sure that each of the different food principles required for perfect nutrition are supplied in ample quantity.

In recent years science has discovered another and most surprising property of food in which it transcends all other fuel substances as a diamond from the Transvaal outshines a lump of coal. Natural food contains vitamines. It has long been known that an exclusive rice diet sometimes causes beri-beri, a form of general neuritis, and that a diet of dry cereals and preserved food in time gives rise to scurvy, but the reason was a profound mystery. In very recent years it has been learned that the real cause of beri-beri and scurvy is the lack of vitamines which are associated with the bran of cereals and so are removed in the process of polishing rice and in the bolting of wheat and other grains.

Vitamines do not enter into the composition of the body as do other food principles, but they are somehow necessary to activate or render active the various subtle elements which are essential to good nutrition.

There are several kinds of vitamines. Some are associated with the bran of cereals, other with the juices of fruits. Some are easily destroyed by heat. while others survive a boiling temperature. The discovery of vitamines must stand as one of the most masterly achievements of modern science, even outshining in brilliancy the discovery of radium. It was only by the most persevering efforts and the application of all the refinements of modern chemical technic that the chemist, Funk, was able to capture and identify this most subtle but marvelously potent element of the food. This discovery has cleared up a long category of medical mysteries. We now know not only the cause of beri-beri and scurvy and the simple method of cure by supplying vitamine-containing foods, but within a very short time it has been shown that rickets and pellagra are likewise deficiency diseases, probably due to lack of vitamines, and in a recent discussion before the New York Academy of Medicine by Funk, Holt, Jacobi and others, it was maintained that vast multitudes of people are suffering from disorders of nutrition due to the same cause.

Osborne a few years ago conducted experiments which demonstrated that something more than pure food elements and salts is essential for growth and development. They found that rats fed on starch and fat lived only four to eight weeks. When protein was added they sometimes lived and grew and sometimes remained stunted or died. It was thus evident that proteins differ. Their observations proved very clearly that there are perfect and imperfect proteins. The protein of corn. zein; for example, was shown to be incapable of supporting life. With the addition of a chemical fraction. tryptophan, obtained from another protein, the rats lived, but did not grow. By adding another fractional protein, lysin, the rats were made to thrive.

A minute study of the subject by Osborne. Mendel and numerous other physiologic chemists have shown that a perfect protein is composed of more than a dozen different bodies called amino-acids, each of which must be present in the right proportion to enable the body to use the protein in body building. Each plant produces its one peculiar kind of protein. The protein of milk, caseine, is a perfect protein. Eggs and meat. of course, supply complete proteins. but among plants there are many imperfect proteins.

McCollum has demonstrated that grains. either singly or in combination will not maintain life and growth. The same is true of a mixture of grains with peas or navy beans. Another element is lacking which must be supplied to support life and growth.

With these facts before us we are prepared to inquire what place in the dietary are nuts prepared to fill? With few exceptions nuts contain little carbohydrate (starch or sugar). They are, however, rich in fat and protein. On account of their high fat content they are the most highly concentrated of all natural foods. A pound of nuts contains on an average more than 3,000 calories or food units, double the amount supplied by grains, four times as much as average meats and ten times as much as average fruits or vegetables.

For example, according to Jaffi's table, ten of our common nuts contain on an average 20.7 per cent of protein, 53 per cent. of fat and 18 per cent. of carbohydrate, as shown in the following table:

	Protein	Fat	Carbohydrate
Almonds	21.4	54.4	13.8
Peanuts	29.8	46.5	17.1
Filberts	16.5	64.0	11.7
Hickory	15.4	67.4	11.4
Pine nut	33.9	48.2	6.5
Walnut	18.2	60.7	13.7
Pecan	12.0	70.7	18.5
Butternut	27.9	61.2	5.7
Beechnut	21.8	49.9	13.8
Chestnut	10.7	7.8	70.1
Average	20.76	53.08	18.23

Meat (round steaks) gives 19.8 per cent. of protein and 15.6 per cent. of fat, with no carbohydrate. A pound of average nuts contains the equivalent of a pound of beefsteak, and in addition, nearly half a pound of butter and a third of a loaf of bread. A nut is, in fact, a sort of vegetable meat. Its composition is much the same as that of fat meat, only it is in much more concentrated form.

There can be no doubt that the nut is a highly concentrated food. The next question naturally is, can the body utilize the energy stored in nuts as readily as that supplied by meat products, for example.

The notion that nuts are difficult of digestion has really no foundation in fact. The idea is probably the natural outgrowth of the custom of eating nuts at the close of a meal when an abundance, more likely a super-abundance, of highly nutritious foods has already been eaten, and the equally injurious custom of eating nuts between meals. Neglect of thorough mastication must also be mentioned as a possible cause of indigestion following the use of nuts. Nuts are generally eaten dry and have a firm hard flesh which requires thorough use of the organs of mastication to prepare them for the action of the several digestive juices. Experiments made in Germany showed that nuts are not digested at all, but pass through the alimentary canal like foreign bodies unless reduced to a smooth paste before swallowing. Particles of nuts the size of small seeds wholly escaped digestion.

Having been for more than fifty years actively interested in promoting the use of nuts as a staple food, I have given considerable thought and study to their dietetic value and have made many experiments. About twenty-five years ago it occurred to me that one of the above objections to the extensive dietetic use of nuts might be overcome by mechanical preparation of the nut before serving so as to reduce it to a smooth paste and thus insure the preparation for digestion which the average eater is prone to neglect. My first experiments were with the peanut. The result was a product which I called peanut butter. I was much surprised at the readiness with which the product sprang into public favor. Several years ago I was informed by a wholesale grocer of Chicago that the firm's sales of peanut butter amounted on an average to a carload a week. I think it is safe to estimate that not less than one thousand carloads of this product are annually consumed in this country. The increased demand for peanuts for making peanut butter led to the development of "corners" in the peanut market, and more than doubled the price of the shelled nuts and to a marked degree influenced the annual production. The nut butter idea also caught on in England.

I am citing my experience with the peanut not for the purpose of recommending this product, for I am obliged to confess that I was soon compelled to abandon the use of peanut butter prepared from roasted nuts for the reason that the process of roasting renders the nut indigestible to such a degree that it was not adapted to the use of invalids. I only mention the circumstance as an illustration of the readiness with which the public accepts a new dietetic idea when it happens to strike the popular fancy.

Ways may be found to render the use of nuts practical by adapting them to our culinary and dietetic customs and to overcome the popular objections to their use by a widespread and efficient campaign of education. Other nuts, when crushed, made most delicious "butters," as easily digestible as cream, since they did not require roasting. I later found ways for preparing the peanut without roasting.

The fats of nuts, their chief food principle, are the most digestible of all forms of fat. Having a low melting point they are far more digestible than most animal fats. Hippocrates noted that the stearin of eels was difficult of digestion. The indigestibility of beef and mutton fat has long been recognized. The fat of nuts much more closely resembles human fat than do fats of the sort mentioned. The importance of this will be appreciated when attention is called to the fact that fats entering the body do not undergo the transformation changes which take place in other foodstuffs; for example, protein in the process of digestion is broken into its ultimate molecular units. Starch is transformed into sugar which serves as fuel to the body, but fats are so slightly modified in the process of digestion and absorption that after reaching the blood and the tissues they are reconstructed into the original form in which they are eaten, that is, beef fat is deposited in the tissues as beef fat without undergoing any chemical change whatever; mutton fat is deposited as mutton fat; lard as pig fat, etc. When the body makes its own fat from starch or sugar, the natural source of this tissue element, the product formed is *sui generis* and must be better adapted to the body uses than the animal fat which was *sui generis* to a pig, a sheep or a goat. It is certainly a pleasant thought that one who rounds out his figure with the luscious fatness of nuts may felicitate himself upon the fact that his tissues are participating in the sweetness of the nut rather than the relic of the sty and the shambles.

It is also worthy of note that the fat of nuts exists in a finely divided state, and that in the chewing of nuts a fine emulsion is produced so that nut fats enter the stomach in a form best adapted for prompt digestion.

Another question which will naturally arise is this: if nuts are to be granted the place of a staple in our list of food supplies will it be safe to accept them as a substitute for flesh foods?

Beef steak has become almost a fetish with many people, but the experiments of Chittenden and others have demonstrated that the amount of protein needed by the body daily is so small that it is scarcely possible to arrange a bill of fare to include flesh foods without making the protein intake excessive. This is because the ordinary foodstuffs other than meat contain a sufficient amount of protein to meet the needs of the body. Nuts present their protein in combination with so large a proportion of easily digestible fat that there is comparatively little danger of getting an excess.

It is also worthy of note that the protein of nuts is superior in quality to that of grains and vegetables. The critically careful analyses made in recent years have shown that the proteins of nuts, at least of a number of them, contain all the elements needed for building up complete body proteins, in other words, nuts furnish perfect proteins, which are not supplied so abundantly by any other vegetable product.

This fact places the nut in an exceedingly important position as a foodstuff. In face of vanishing meat supplies it is most comforting to know that meats of all sorts may be safely replaced by nuts not only without loss, but with a decided gain. Nuts have several advantages over flesh foods which are well worth considering.

1. Nuts are free from waste products, uric acid, urea, carmine and other tissue wastes.

2. Nuts are aseptic, free from putrefactive bacteria and do not readily undergo decay either in the body or outside of it. Meats, on the other hand, are practically always in an advanced stage of putrefaction, as found in the meat markets. Ordinarily meats con-

tain from three million to ten times that number of bacteria per ounce, and such meats as hamburger steak often contain more than a billion putrefactive organisms to the ounce. Nuts are clean and sweet.

3. Nuts are free from trichinae, tapeworm and other parasites, as well as the infections due to specific disease. Nuts are in good health when gathered and remain so until eaten. The contrast between the delectable product of the beautiful walnut, chestnut or pecan tree and the abattoir recalls the story of the Tennessee school teacher who was told when she made inquiry about a certain shoulder of pork which had been promised in part payment of services, but had not arrived: "Dad didn't kill the pig." "And why not," said the teacher. "Because," replied the observing youngster, "he got well." Nearly all the cows slaughtered are tuberculous. They are killed to be eaten because too sick to longer serve as community wet nurses.

That nuts are competent to serve as staple foods might be infered from a fact to which Professor Matthews, of the New York Museum of Natural History, calls attention to, to wit, that our remote ancestors, the first mammals, were all nut and fruit eaters. They may have gobbled an insect now and then, but their staple food was fruits and nuts, with tender shoots and succulent roots, which is still true of those old fashioned forest folks, the primates of which the orang outang, the chimpanzee and the gorilla are consistent representatives, while their near relative, also a primate, civilized man, has departed from his original bill of fare and has exploited the bills of fare of the whole animal kingdom.

The keeper of the famous big apes of the London Zoo informed me that they were never given meat. Even the small monkeys generally regarded as insectivorous, were confined to a rigid vegetarian fare and were thriving.

Whole races of men, comprising many millions, live their entire lives without meats of any sort, and when fed a sufficient amount are wonderfully vigorous, prolific, enduring and intelligent. Witness the Brahmins of India, the Buddists of China and Japan and the teeming millions of Central Africa.

Carl Mann, the winner of the great walking match between Berlin and Dresden, performed his great feat on a diet of nuts with lettuce and fruits. The Finn Kilmamen, the world's greatest runner, eats no meat. Weston, the long-distance champion, never eats meat when taking a long walk. The Faramahara Indians, the fleetest and most enduring runners in the world are strict vegetarians. The gorilla, the king of the Congo forests, is a nut feeder.

Milo, the mighty Greek, was a flesh abstainer, as was also Pythagoras, the first of the Greek philosophers, Seneca, the noble Roman Senator, and Plutarch, the famous biographer. The writer has excluded meat from his diet for more than fifty years, and has within the last forty years, supervised the treatment of more than a hundred thousand sick people at the Battle Creek Sanitarium on a meatless diet.

Even carnivorous animals flourish on a diet of nuts with other vegetable foods and cooked cereals. The Turks mix nuts with their pilaff of rice and the Armenians add nuts to their baalghoor, a dish prepared from wheat which has been cooked and dried.

That nuts are not only competent to serve as a staple food, but that they may fill a very important place as accessory foods in supplementing the imperfect proteins of the grains and vegetables is shown in a very conclusive way by an extended research by Dr. Hoobler, of Detroit.

Before describing Dr. Hoobler's experiment I may be allowed to explain that some years ago, in 1899, I was asked by the then United States Secretary of Agriculture to undertake experiments for the purose of providing a vegetable substitute for meat. Dr. Dabney said there was no doubt that the time would come when such substitutes would be needed on account of the scarcity of meat. I succeeded in developing several products which have come to be quite widely known and used more or less extensively in this country and Europe. Among these were Protose (resembling potted meat) and malted nuts, a soluble product somewhat resembling malted milk. It was noted that the malted nuts when used by nursing mothers greatly increased the flow of milk and promoted the health of the infant. Recently Dr. Hoobler undertook an extensive feeding experiment with nursing mothers and wet nurses as subjects. He made use of these nut preparations as well as of ordinary nuts and compared the results with various combinations into which meat and milk entered in various proportions. He found that a diet of fruits, grains and vegetables alone gave a very poor quality of milk, but when nuts were added the result was a milk supply superior in quantity and quality to any other combination of foodstuffs, not exceptng those which included liberal quantities of milk, meat and eggs. From this it appears that nuts possess such superior qualities as supplementary or accessory foods that they are able to replace not only meats, but even eggs and milk in the dietary. The full account of Dr. Hoobler's interesting observations will be found in the Journal of the American Medical Association for August 11, 1917.

Extensive feeding experiments are now being conducted at the research laboratory of the Battle Creek Sanitarium, which it is hoped will develop still other points of interest respecting the superior nutritive properties of the choicest and most remarkable of all the food products which are handed to us from the fertile laboratory of the vegetable world.

Another and most interesting phase of my subject is the relation of nut feeding to anaphylaxis. This newly coined word perhaps needs explanation for the benefit of my lay hearers. For many years it has been known that some persons were astonishingly sensitive to certain foods which indeed appeared to act as violent poisons. Oysters, shellfish, mutton, fish and other animal products, as well as a few vegetable products, especially honey, strawberries and buckwheat, were most likely to be the cause of these violent disturbances. More recently it has been found that cow's milk very often shows the same peculiarity. It is now known that this remarkable phenomenon is due to the fact that the body sometimes becomes sensitized to certain proteins which thereafter act as most violent poisons and may cause death. Sensitization to animal proteins is much the more frequent. In such cases nut products become a very precious resource. This is especially true with reference to cow's milk.

Liquid nut preparations have saved the lives of hundreds of infants within the last twenty years. I have had the pleasure of meeting several fine looking young people who owed their lives to nut-feeding when other resources had failed. One case was particularly interesting. A telegram from a well-known Senator at Washington announced the fact that his infant daughter and only child was dying from mal-nutrition, as cow's milk and all the known infant foods had been found to disagree. I advised nut-feeding, and fortunately the prescription suited the case and the little one began to improve at once. When the physician in attendance learned that the child was eating nuts he vigorously protested, declaring that such a diet was preposterous and would certainly kill the infant, but the child flourished wonderfully on the liquid nut diet, eating almost nothing else for the first three years of her life, and today is a splendidly developed young woman, a brilliant witness to the food value of nuts.

I have by no means exhausted the physiologic phases of my subject, but will now turn a moment in concluding my paper, to its economic aspects.

The high price of nuts is constantly urged as an objection to their use as a staple. It is probable that a largely increased demand would lead to so great an increase in the supply that the cost of production, and hence the cost to the consumer, would be decreased. But even at the present prices the choicest varieties of nuts are cheaper than meats if equivalent food values are compared. This is clearly shown by the following table which indicates the amounts of various flesh foods which are equivalent to one pound of walnut meats.

Beef loin, lean	4.00	pounds
Beef ribs, “	6.50	“
Beef neck, “	9.50	“
Veal	5.50	“
Mutton leg, lean	4.20	“
Ham, lean	3.00	“
Fowls	4.00	“
Chicken, broilers	10.00	“
Red bass	25.00	“
Trout	4.80	“
Frogs' legs	15.00	“
Oysters	13.50	“
Lobsters	22.00	“
Eggs	5.00	“
Milk	9.50	“
Evaporated cream	4.00	“

But the great economic importance of the encouragement of nut culture in every civilized land is best shown by comparing the amount of food which may be annually produced by an acre of land planted to nut trees and the same area devoted to the production of beef. I am credibly informed that two acres of land and two years are required to produce a steer weighing 600 pounds. The product of one acre for one year would be one-fourth as much, or 150 pounds of steer. The same land planted to walnut trees would produce, if I am correctly informed, an average of at least 100 pounds per tree per annum for the first twenty years. Forty trees to the acre would aggregate 4,000 pounds of nuts, or 1,000 pounds of walnut meats. The highest food value which could be ascribed to the 150 pounds of beef would be 150,000 calories or food units. The food value of the nut meats would be 3,000,000 calories, or twenty times as much food from the nut trees as from the fattened steer, and food of the same general character, protein and fat, but of superior quality.

One acre of walnut trees will produce every year food equal to:

14,000 lbs. red bass (a ship load).
3,000 “ beef (five steers).
7,500 “ chicken broilers.
15,000 “ lobsters.
10,000 “ oysters.
60,000 eggs (5,000 dozen).
4,000 qts. milk.
A ton of mutton (13 sheep).
250,000 frogs.

And when one acre will do so much, think of the product of a million acres.

Ten times the product of all the fisheries of the country.

Half as much as all the poultry of the country.

One seventh as much as all the beef produced.

More than twice the value of all the sheep.

Half as much as all the pork.

And many millions of acres may be thus utilized in nut culture.

And the walnut is not the only promising food tree. The hickory, the pecan, the butternut, the filbert and the piñon are all capable of producing equal or greater results.

A single acre of nut trees will produce protein enough to feed four persons a year and fat enough for twice that number of average persons. So 25,000,000 acres of nut trees would more than supply the whole people of the United States with their two most expensive food stuffs. Cereals and fresh vegetables, our cheapest foods, would be needed for the carbohydrate portion of the dietary. Just think of it. A little nut orchard 200 miles square supplying one-third enough food to feed one hundred million of citizens. The trouble is the frogs and cattle are eating up our food supplies. We feed a steer 100 pounds of food and get back only 2.8 pounds. If we plant 10 pounds of corn we get back 500 pounds. If we plant one walnut we get back in twenty harvests a ton of choicest food. In nut culture there is a treasury of wealth and health and national prosperity and safety that is at present little appreciated.

Here is a veritable treasury of wealth, a potential food supply which may save the world from any suggestion of hunger for centuries to come if properly utilized. Every man who cuts down a timber tree should be required to plant a nut tree. A nut tree has a double value. It produces valuable timber and yields every year a rich harvest of food while it is growing.

Every highway should be lined with nut trees. Nut trees will grow on land on which no other crop will grow and which is even worthless for grazing. The piñon flourishes in the bleak and barren peaks of the rockies.

The nut should no longer be considered a table luxury. It should become a staple article of food and may most profitably replace the pork and meats of various sorts which are inferior foods and are recognized as prolific sources of disease.

Ten nut trees planted for each inhabitant will insure the country against any possibility of food shortage. A row of nut trees on each side of our 5,000,000 miles of country roads will provide for a population of 160,000,000. With a vanishing animal industry, nut culture offers the only practical solution of the question of food supply. As the late Prof. Virchow said, "The future is with the vegeterians."

THE IMPORTANCE OF NUT GROWING.

H. W. Collingwood, New Jersey.

In these days the importance of most things is valued in figures. I never was good at figures. It seems to me that you can do anything you like with figures, except make them clear, yet it was the failure to figure that gave me my first idea of the importance of nut culture. Some 50 years ago a small boy on a New England farm could not, or would not, do his sums in the old Coburn Arithmetic. It made no difference that the teacher called it Mathematics, and pointed it with the end of a hickory stick. By any other name it was not sweet.

This boy got stuck on a question about a hare and a hound. It appeared that the hare jumped a rod at a time, and made 33 jumps a minute. The hound started 200 feet behind the hare. This hound made 18 ft. at a jump., and made 32½ jumps a minute. Now, would the hound catch the hare before they got to a hickory tree half a mile away?

I am glad they introduced that hickory tree because the question was a hard nut at best and needed brain food. I couldn't tell where the hare would be, and I can't now: nor do I believe that some of you wise heads, grown hairless with constant thinking, could really tell how the hare came out. If I saw one of my children headed for me with such a problem in hand, I confess that I should make a prompt engagement outside. The old folks who brought me up. had sterner ways of enforcing education. They decided that the boy should live on brown bread and water until he did that example. In order to assist hunger in bringing the boy to it. after the first day showed that the boy was still going. the old gentleman hunted up all the axes and hatchets. scythes and knives on the place, and made the boy turn grindstone while he held the implements on. Greek met Greek. The boy wouldn't give in. and the old man couldn't and preserve his dignity. but try as he might the old man could not tire out the boy; the old hands gave out first. and the old man straightened his back and gazed at that wonderful boy. Now it wasn't in brown bread and water to sustain strength and will in that way. Not when there are baked beans for supper and you can smell them! The old man had to acknowledge a higher power which beat him. He wouldn't do it openly. that was not the New England way. but he did it on the second night by helping the boy to baked beans and fried potatoes without a word. The old man went to his death thinking that he had a most wonderful boy, and the little fellow did not give his secret away. Now we may have it as a slight contribution to the importance of nut culture. The sustaining power which carried the boy through his trial was the hickory nut. There was a pile of them in the attic. and the boy on the quiet. cracked and ate a quart of them every day. That boy could not spell protein to save his life. and carbo-hydrates would have scared him off the floor. but the nuts and the brown bread gave him a balanced ration which did everything except find out about the hound and the hare. I think it would have required a balanced ration fed to an unbalanced brain to settle that problem.

Now I think the importance of the nut industry must come to the general public in that way. through the stomach rather than through the mind. The human mind is a marvelous piece of mental machinery. so is the machine which sets type or weaves fine cloth. yet both are powerless unless the fire pot under the engine. or the stomach of the man. are kept filled with fuel or food. I have heard very old men tell of the prejudice which existed against coal. years ago. in New England. when attempts were made to introduce the new fuel. Cord wood was the local fuel. people knew what it was. and its preparation provided a local industry. The introduction of coal meant destruction for this local business of wood cutting. and wiped out the value of many a farm. Coal had to win its way against prejudice and local interest. and it only won out by showing power. I am sure that 75 years ago. if some visionary Yankee had said that coal would be so freely used in New England that cord wood would be almost unsaleable. the public would surely have given him that honorary title which goes with prospective and persistent knowledge, "nut."

In like manner the importance of nut growing will not be truly recognized until we can show a man in the most practical way that nuts provide the energy to be found in beef steak. It is said that knowledge creates an atmosphere in which prejudice cannot live. I know an old man who is absolutely settled in his conviction that New England has degenerated because her people have given up eating baked beans and cod fish balls, and introduced the sale of these delicacies in the West. That man says, with convincing logic, that in the old days when New England lived on brown bread and baked beans, we produced statesmen on every rocky hillside, and we dominated the thought of the nation. Now, he says, we have not developed one single statesman since the canned baked bean industry took our specialty away from us. The only way to convince him is to produce a dozen statesmen out of men who are willing to subscribe to a diet of nuts. I have a friend who says he feels like throwing a brick every time he passes a modern laundry. He says the invention of the linen collar kept him a poor man. His grandfather invested the family fortune in the stock of a paper collar factory. Many of our older men remember the time when we all wore paper collars, and bought them by the dozen in boxes. It seemed like a sure thing when the old man put all his money into it. He figured that by 1915 there would be 40,000 people in this country, each one wearing at least 200 paper collars a year, something like the hound and the hare, perhaps, but he didn't know that the hare in this case would drop dead, and the hound double his jump, as happened to paper and linen collars. Some one invented the modern linen collar. The laundry service started up, and paper collars disappeared with the family fortune. Now, my friend must work for a living, and throw mental bricks at the laundry. In a way every new habit, or every new interference with the thought and method of the plain people must run the gauntlet and submit to just such violent changes.

Now the future of the nut business, which contains the importance of the industry, depends upon our ability to make the plain, common people understand that in the future we must cut our beef steak and our chops off a nut tree. We have made some of the brainy people understand this already, but the hound is still chasing the hare, and he is several jumps behind. You may say what you will, or think as highly as you like of your own place in society, but the world is not run or pushed on by the brainy people. They may steer it for a while and master it, but only at the permission of what I may call the stomach people, who always sooner or later rise up and dominate things. A gild-edged, red line edition of nut knowledge will get the few or select class, but in order to make the industry truly important we must make a homely appeal to the plain people. It seems to me that one of the most effective nut documents yet issued is that bulletin by George Carver, a colored man at the Tuskegee Institute. Carver simply makes his appeal to the Southern farmer, and he gives him 45 ways of cooking and eating peanuts. I rather think that Carver's work in trying to get the Southern negroes to eat more peanuts and more cow-peas has done about as much for the race as the academic instruction given in the college.

On the principle that "Like begets like," I feel sure that the continued practice of cracking the shell to get at the sweet meat inside will tend to put more phosphorus and less lime into the skull of the race. I once explained the nut proposition to an energetic man and he said: "Fine—the theory is perfect—now hire a man who lives on rare beef to get out and fight for your proposition and you will put it over!"

Last year I went up into New York State with a prominent public man, who was to make a speech. This man was delayed, and in order to get there he had to jump on the last platform of the last car. He had eaten no lunch, and only a light breakfast. He said he should surely fail in his speech because he was faint from lack of food. I asked him what he would eat if he had the chance. He said soup, half a chicken, potatoes and asparagus, and apple pie. I told the train boy to bring samples of everything he had, and we finally selected an apple from Oregon, a banana from Mexico, a box of figs from California, some pop corn from Massachusetts, chocolate from Venezuela, and salted nuts from Louisiana. The air and the sunshine and the water seemed to be produced in New York, but nothing else. A great dinner for a New York man, but to his surprise it satisfied him, took the place of the chicken, and carried him through his speech with a strong punch. It seems to me that one trouble with our nut propaganda is that we go at it in such a way that the pupils regard us somewhat as "nuts," and why should the man who becomes a specialist on any subject, and airs it on all occasions, be called a nut? We shall have to admit that men are called such names. I think it is because we let our brains work somewhat like the oyster or clam, and secrete a hard shell of formal knowledge around the sweet meat of condensed human nature, for that is what all useful knowledge is. We must crack our shell of formal knowledge and grind it up finer before we can put it into the think works of the plain people.

While I was working up the Apple Consumers' League some years ago, I ran upon the fact that Corbett, the prize-fighter, consumed 3 dishes of apple sauce every day while training. Now, I had used the statement that J. P. Morgan always had a baked apple for his lunch, but I got small results from that story. Few people ever expected to make millions, and Morgan was out of their class. Every man carried a punch, which he wanted to enlarge and make effective. If Corbett used apple sauce to oil his arm for a knock-out blow, every man with red blood wanted apples. Now we must work our nut campaign in some such popular way, if we expect to put a nut on the wheel of progress. The fact that Prof. Johnson, or Dr. Jackson, or the Rev. Thompson, or Judge Dixon, or Senator Harrison, find strength and comfort from eating nuts, is very important and very pleasant, but 99 per cent of our people never expect to enter the learned profession, and they must not get the idea that these professions stand around the full use of nuts like a barbed wire fence. Most men must live and work in the rough and tumble of life, and at present they think red meat is the sustaining power for that sort of stuff. We must change their point of view. Let us find athletes, baseball men, wrestlers, fighters, runners, men who stand well in popular sports and who will publicly state that they substitute nuts for meat in part at least. We must put this thing into the popular imagination of the plain people if it is to be of full importance. When some fellow with a new brand of cigarettes wants to develop a trade among young men, he gets some noted ball player to write a letter stating his love for that brand. I think we should follow that plan somewhat in putting our nut campaign before the people. Two years ago the Oregon Agricultural College sent a football team East. The college was almost unknown here, but I asked one or two football men about it. They laughed at these Pacific Coast athletes. Here was a college they said which had issued a bulletin advising the people to send their children to school with nut sandwiches instead of meat. This man said that such training could only result in puny, half grown men, and he doubted if this team would last half way across the country. Those Oregon boys lined up a team of giants. They simply wiped the earth with most teams of their class, and left behind the cracked shells of a long line of reputation, with the sweet meat well picked out.

Personally I believe that within 25 years, 50 at the latest, our people will be absolutely forced to accept a diet of nuts in place of our present proportion of meat. As I see it, the time is coming when increased population and shortage of available land will make prime beef nearly as scarce as turkey and vension are today. Not only so, but I think knowledge will slowly but surely lead men to change their diet from choice. My children will live to see the time when the acre nut orchard on the average farm will be considered just as useful and as much of a necessity, and far more profitable, than the present chicken yard. In that day I think the nut industry will rank in food importance second only to that of corn, and I believe that the greatest change will be found here in New England, for I believe that nut culture is to change history, and readjust population and industry to some extent. Frankly, I expect my children to live to see the time when the hickory nut in New England will rank far above the walnut industry in California or in France. I think this nut culture will, in time, bring a greater income to the New England States than all its fruits and grain combined today. Out in the wild woods on some New England hillside there are growing today strains or varieties of nuts which will do far more for this section than the Baldwin apple, or the Bartlett pear have ever done. They will be found, tamed and propagated.

You may, if you like, call me a dreamer, or what is the same thing, a "nut." I can stand that, for have I not in my short span of life seen dreams come true. Suppose the wandering hunter, or the farmer's boy, who discovered the Baldwin apple in the woods of Massachusetts, had gone back to his home and stated that the time would come when this beautiful red fruit would grow wherever it found a suitable climate, that it would revolutionize horticulture, bring millions of dollars to New England, and find its way throughout the world wherever the sails of commerce are blown. They might have hung him as a witch or dreamer, and yet, his dream would be no more improbable than what I say of nut culture in New England. I have seen the telephone, the flying machine, the gasoline engine, all grow from the vain dream of a crazy inventor to public necessities, and as surely as fate the nut industry is to bring back to the old hillsides of New England much of the profit and the glory of old days.

THE PROPER PLACE OF NUT TREES IN THE PLANTING PROGRAM.

By C. A. Reed, Nut Culturist,

U. S. Department of Agriculture.

In the planting of trees for most purposes, it is now possible to exercise practically the same degree of choice with regard to special fitness as is employed in the selection of men for positions or tools for a piece of work. The fruit grower in every part of the country has his special species and pomological varieties from which to choose. The foresters and landscape gardeners have their species and botanical varieties or improved strains to pick from.

Among the important purposes for which trees are planted the production of native nuts is singularly behind. The leading species of native nut-bearing trees include the hickories, the walnuts, the chestnuts, the pines, and the beech. Of these, one of the hickories, the pecan, is the only species which has so far been developed by cultivation as to become of importance for the production of an orchard product.

The timber of the pecan is less valuable than is that of most other hickories, and is in commercial use only as second-class material. However, it is the most important species of nut-bearing tree in the United States. Its native and introduced range includes the fertile lands of the plains of practically the entire southeastern quarter of the country. It is neither an upland nor a wet land tree. In the United States it is not found in the mountainous sections, nor, to any important extent, south of Middle Florida. In Mexico, it is occasionally found on mountain sides at considerable elevations and by some is supposed to be there indigenous. However, according to "Pomological Possibilities of Texas," written by Gilbert Onderdonk, of Nursery, Texas, and published by the State Department of Agriculture in 1911, its success at those altitudes is vitally dependent upon the water supply. In each case investigated by Mr. Onderdonk, while upon official trips made for the United States Department of Agriculture, he found the pecan trees to be adjacent to some stream, either natural or artificial. "At Bustamente," says Mr. Onderdonk, "one hundred and seven miles beyond Laredo, are pecan trees two hundred years old that have been watered all their lives and have continued productive. From these trees, grown from Texas pecans, pecan culture has been extended until there are now thousands of thrifty pecan trees under irrigation. One owner of a small lot sold his waterright when his trees were about seventy-five years old, and when the writer visited his grounds fourteen years later, every one of his trees was either dead or dying.''

We may yet find the pecan to be suitable for plateau or mountain land growth, but as Mr. Onderdonk reports was the case in Mexico, it is also the case here. The species must have ample water. With the proper amount of moisture, neither too much nor yet too little, there is no way of predicting to what altitudes or even latitudes it may be taken. Its northernmost points of native range are near Davenport, Iowa, and Terre Haute, Indiana. Iowa seed planted in 1887, at South Haven, Michigan, on the eastern shore of Lake Michigan, at a latitude of about 42½ degrees, have never been seriously affected by winter temperatures. However, they have fruited but little. So far as the writer can ascertain the crops of nuts have been insignificant both as regards quantity and character. Dr. Deming reports a large tree at Hartford, Conn., at a latitude of nearly 42 degrees which, judging from a photograph which he took several years ago, was then 3 feet in diameter and quite at home, so far as growth was concerned.

Other planted trees are fairly numerous along the Atlantic Coast between Washington and New York. There is one in the southern part of Lancaster County, Pa., near Colemanville, but so far as is known to the U. S. Department of Agriculture, important crops of nuts have never been realized from any of these northern trees. Crops from the native trees in the bottoms north of latitude 39 degrees or approximately that of Washington, D. C., and Vincennes, Indiana, are fairly uncertain. Northern nurserymen are now disseminating promising varieties of pecans from what has come to be known as the ''Indiana district,'' which includes the southwestern part of that state, northwestern Kentucky and southwestern Illinois. In many respects these varieties compare very favorably with the so-called ''papershells'' of the southern states. They are believed to be of very great promise for northern planting in sections to which they may be adapted. However, before any northern varieties are planted for commercial (orchard) purposes, they should be fully tested as to their adaptability in the particular section where the planting is to take place. The commercial propagation of northern varieties of pecans began less than ten years ago: the first attempts were not generally successful, and as a result there are no budded or grafted trees of northern varieties yet of bearing age.

Aside from the pecan there are no named pomological varieties of any native nut now being propagated, with very few exceptions. So far as these exceptions are concerned, it is probable that fewer than one hundred budded or grafted trees of such varieties are yet of bearing age, and of such as have attained the age at which fruit might be expected, exceedingly few have borne in paying quantities for any number of consecutive years. Therefore, with reference to the planting of native nut species for profit, the truth of the situation is simply this: In the ordinary course of events, with the exception of the pecan, years of experimentation in the testing of varieties and in a study of their cultural requirements must be gone through before any native species of nut-bearing trees can be planted in any of the northern states with a certainty of commercial return from nuts alone which would be comparable with that of many other crops which already are upon a well established commercial basis in this part of the country.

With reference to two of the foreign species of nuts which have been introduced, the situation is quite different. In order of commercial importance of the nuts now grown in this country,. two foreign species, the Persian (English) walnut and the almond, stand second and third, respectively, the pecan, which is an American species only, being first. With these exceptions, the foreign introductions are all in the experimental or test stage, and while possibly the European hazel (filbert) may now be making a strong bid for commercial recognition in the northwest, and the pistache in parts of California, neither species can yet be recommended for commercial planting.

With the exception of a few hardshell varieties of almonds, which are practically as hardy as the peach and which are suitable only for home planting, as they are in no way to be compared with the almond of commerce, there is now no indication that this species is destined ever to be come of commercial importance east of the Rocky Mountains.

The Persian or so-called English walnut is of commercial importance in this county only in the far Western States. In the South, it has thus far failed altogether. In the North and East it has held out gleams of hope, first bright, then dull, for more than a century. There is no way of telling the number of trees of this species which have been planted in the northeastern section of the country, but let us imagine it to have been sixty thousand. Of these fully fifty per cent have succumbed to climatic conditions; twenty-five per cent have been but semi-hardy, and possibly twenty-five per cent have attained the bearing age. A part of each of the last two classes have borne crops of commercial size for a number of years. Some have produced nuts of good size and quality. A great many of all those surviving are now proving susceptible to a walnut blight upon which Mr. McMurran is to report tomorrow. A liberal estimate of the present number of bearing Persian walnut trees in this part of the country would be ten per cent of the original supposed sixty thousand or six thousand trees. Of these, the writer has positive knowledge of none which are now bearing crops of nuts in such quantity, and of such size, and quality and with such regularity and which have so borne for such length of time as to encourage commercial planting. Few of the eastern grown nuts are so free from tannin as to be really pleasing to the taste, or favorably comparable with the best nuts of the market. The writer is now closely watching the best known varieties which the nurserymen are putting out, but at the present time there is no variety which, in his judgment, should be commercially planted without further testing.

The proper place for such partially improved species, as are most of the nut producers hardy in this section at the present time, is that in which they may be used for more than the single purpose of nut production. Most of the species of the botanical family *Juglandaceae,* to which the walnuts and hickories belong, are slow growers, and as such, are objectionable to the average planter. In answer to this, it may be said that among trees, slowness of growth is invariably associated with longevity of tree and its value when cut as timber. Also, when due pains are taken, it is possible to select species which are exceedingly satisfactory in the landscape. Several of the slides, which are to follow, illustrate the individual beauty of selected nut trees, and some show their effective use in the landscape.

Foresters are now advocating the planting of trees in waste places in the country, especially about farm buildings. There are, perhaps, no conspicuous waste places with a greater aggregate area than the strips along the public highway. In certain foreign countries, these strips are planted to fruit trees and the right of harvest awarded to the highest bidder. The revenue so obtained goes a long way toward keeping the highways in good condition. It is possible that this practice may sometime be introduced into the United States, but until public opinion is radically changed, the planting of fruit trees along the highways can not be expected to yield any satisfactory returns to the public. The experience of Dr. Morris who planted cherry trees along the public road past his farm here in Connecticut, where we have just been, is typical of what, under present conditions, might be expected in any part of the country.

When the cherries were ripe, automobile parties came for many miles to pick the fruit, and when that in the highway was gone, the cherries from the nearby orchard were taken. In both cases, the branches were broken down and the trees left in badly mangled condition. Dr. Morris then tried nursery-grown and expensive evergreens, but on Sundays, automobile parties came again with spades and shovels and dug up the trees.

The ratio of population to tillable land in this country is not such that, for a long time to come, the American people as a whole will be pressed into the using of highway land for the production of crops or into respecting the right of the public to harvest such crops as might be grown in its highways. Therefore, for the present, except in densely populated, or in more than ordinarily well regulated communities, it would be useless to advocate the planting of ordinary fruit trees along the public roadways.

Irrespective of the possible value of their crops, fruit trees of most species are both too small and too short-lived to be suitable for highway planting. With nut trees, the situation is entirely different. The native walnuts, most species of hickories and the American beech are large-growing and long-lived trees. In addition, they are capable of withstanding severe temperatures; they are tough and strong and not liable to injury by storm or while being climbed by ordinary persons; and they readily adapt themselves to a wide range of soil, moisture, and climatic conditions.

Ordinary species of nut trees can not be recommended for the dual purpose of timber and nut production, as, for the former purpose, the trees should be planted close together in order to induce length and straightness of trunk with a minimum of top or bearing surface, while for the latter, they should be planted in the open and given space for the maximum development to bearing surface and a minimum length of trunk. The great demand for hickory in the making of axles, wheels, and other vehicle parts and handles for tools, and for walnut in the manufacture of furniture and gun stocks, makes it not only possible but common practice to use these woods in short lengths. Therefore, both species planted along the highways and in other waste places might profitably be converted into their timber upon reaching maturity, if their crops of nuts should prove to be of small commercial value.

The butternut, *J. cinerea,* is a less symmetrical grower than are the black walnuts. The timber is less valuable and the nuts are cracked with greater difficulty. Nevertheless, it is the most hardy of any native species of *Juglans.* Its kernels are rich in quality and of a flavor more pleasing to some persons than that of any other nut. Cracking the native butternut and marketing the kernels affords the rural people in many sections a fairly profitable means of employment during the winter months. Its native range extends farther north than does that of either the eastern black walnut, or that of the shagbark hickory, *Hicoria ovata,* and considerably beyond that of the shellbark hickory, *H. laciniosa.* Therefore, in view of its hardiness, and the merit of its kernels, it is well worthy of consideration for planting in the most northern parts of the country.

Were it not for the blight which is now making practically a clean sweep of destruction over the eastern states, wherever the native chestnut is found, the American chestnut, *Castanea dentata,* would certainly be entitled to leading consideration as a highway, an ornamental or a nut producing tree. Unaffected by blight or other diseases, it is one of the largest-growing and most graceful species in the eastern United States. The European chestnut is nearly as susceptible to this blight as is the American species. The chestnuts from eastern Asia now appear to be sufficiently immune to offer a practical solution to the situation by their introduction into this country. However, they commonly lack the sweet agreeable flavor of the American species and need hybridizing in order to improve their quality. This, the Federal Department of Agriculture is now doing, and in due time, there may be something to offer in ample quantity which will make a satisfactory substitute for the native species. Exclusive of the Asiatic species and the government hybrids, there are now no available species which can be recommended for planting in the blight affected area, and these should be planted only for test purposes.

The pines referred to at the outset of this article as being important nut producers are all western species found only on the mountains and nowhere under cultivation. There are at least fourteen American species. Representatives are found in most of the Rocky Mountain states. The most important species is *Pinus edulis.* It is found at altitudes of from five to seven thousand feet in the mountains of New Mexico, Arizona and northern Mexico. In favorable years, the seeds are gathered in enormous quantities under the name of "piñons," or according to the Mexicans, "pinyonies." The nuts are rich in flavor but small and difficult to extract from the shells. They are not well known in the eastern market, but in the southwest they form a highly important article of food for the Indians and Mexicans. These pines are exceedingly slow growers and not of graceful form. They could scarcely be considered for ornamental planting, except at the altitudes to which they are common, and then, probably, only where some more satisfactory shade trees would not succeed.

Among all American species of trees, it is probable that in a combination of beauty, longevity, strength and hardiness, the American beech, *Fagus grandifolia*, is unexcelled. Although commonly looked upon as being a northern species, its range extends south to northern Florida and west to the Trinity River in Texas. It is most familiar as a clean-barked, spreading tree, with low head, and a height of from fifty to sixty feet. However, its form depends largely upon environment. The writer has seen it in the bottoms of southwestern Georgia, in common with the magnolia, growing to a height of from seventy-five to one hundred feet and with trunks of two feet in diameter extending upward in a manner which, with regard to height and uniformity of size, compared favorably with the long-leafed Georgia pine. The nuts of the beech are rich in quality and of excellent flavor, but owing to their small size and the great difficulty attending the extraction of the kernels, they are not ranked as being of direct importance for human food. Their principal use in this country is as a mast crop for turkeys and swine, for which they serve a most useful purpose. Crops which can be used in this manner to good advantage, thus practically obviating the problems of harvesting, storing and marketing, are certainly well worth thinking about in these days of labor scarcity.

There are few large sections of the United States adapted to the growing of trees to which some nut-bearing species is not suited. Most species of nut trees are as capable of producing shade and ornamental effect, and are as hardy and lasting as any others which might be mentioned. In addition, they produce an edible product which is entering into the list of staple food products with great rapidity. The present scarcity of meats and the consequent high prices are compelling the substitution of other products. The superiority of nuts over practically all other products which are available, as substitutes, scarcely needs argument. Already, nuts are being pressed into service as rapidly as production permits, and perhaps more so than prices and comparative food values justify. Singularly enough, this section of the United States, which is the oldest and most thickly populated portion of the country, and that within which the greatest number of edible species of nuts are indigenous, is today practically without pomological varieties for planting. Within this area, individuals have made tests of species and varieties for many generations, yet little progress has resulted. The obvious need is for further test on a large scale. A better opportunity for the making of such a test could scarcely be imagined than that of highway planting.

Pomologists are firmly recommending the exclusive use of budded or grafted trees. But this advice applies only to orchard planting for the purpose of commercial production. Until more and better varieties are known and their merits established, that portion of the country lying north of the pecan belt and east of the Rocky Mountains, must await the development and trial of new varieties. Seedlings must be planted in large numbers from which to select varieties. The process is too slow and the percentage of varieties which may be expected to be worth while too small for it to be possible for the individual to make much headway during an ordinary lifetime. Our present system of national highways by which all parts of the country are being connected is perfecting the opportunity. The general planting along these great national highways of elm, oak, poplar, tulip, cedar, hemlock, magnolia, pine or any other species which, unless cut, are capable of producing no crop other than that of shade, would hardly be in keeping with the present need for utility. It would be giving a questionable degree of thought to the welfare of future generations.

To the list of nut trees as utility trees there might be added the sugar maple, and certain species of prolific-bearing oaks. The former could be drawn upon for the making of syrup and sugar, and the acorns from the latter could be put to good use as hog and turkey food. In wet sections, willows might prove useful from which to cut material for baskets, furniture, or tying bundles.

A way of overcoming the objection of slow growth of some of the nut species might be the alternate planting of quick-growing species which would furnish shade in a minimum length of time, and which could be cut for pulp or other purposes by the time the nut trees reach maturity.

A practical objection to highway planting of nut trees is that unless cared for, such trees are in danger of becoming breeding places for diseases and insect pests which would quickly spread to nearby orchards. However, such planting in numbers too small to be worth caring for is not to be considered. Already the country is agreed that the maintaining of the middle of the road in such condition that it can render maximum service is a paying investment. The suggestion here made is only as the next step in highway investment. It is a proposition to make more comfortable and attractive the present system of roadways, and at the same time to help develop new varieties of nut trees for orchard planting. Unless such new varieties are soon to become available, a large part of the country will presently find itself dependent upon outside sources for its principal substitute for meat and its main supply of vegetable fats.

A little thought should be able to work out a sound program for the planting of utility trees on practically every highway in this country.

Since this manuscript was completed, attention has been called to a reference to a war use of the horse chestnut, which appears on page 18 of the July number of "My Garden," a monthly publication, with headquarters at 6 Bouverie Street, Fleet Street, London. As the heading "NEW USE FOR HORSE CHESTNUTS," and its sub-head "Cereal Saving," both indicate it may be of interest to the American people, although the production of horse chestnuts in this country is not large. The article which is credited to The Times, is as follows: "An important war time use has been found for horse chestnuts by the systematic collection and transport of all the nuts that can be obtained to the centre where they can be utilized. Up to the present time cereals have been necessary for the production of an article of great importance in the prosecution of the war. Under the direction of the Food (War) Committee of the Royal Society, which acts for and in consultation with the Royal Commission on Wheat Supplies, the Minister of Food, and the Minister of Munitions, experiments have been carried out during the winter to find a substitute for these cereals, and thus to set them free for food supplies. Brilliant work has ended in the difficulties being overcome, and the proof that the seeds of the horse chestnuts answer the purpose admirably. Except as food for deer and goats the seeds have, in the past, been practically a waste crop, and they can be used instead of cereals, essential for human consumption, without interfering with any existing industry or interest.

"The organization for the collection and transport of all that can be obtained is being rapidly perfected. When the time comes it will be the privilege and duty of every owner of a tree or trees to help and to give facilities for the collection of the nuts. Every ton of chestnuts collected will set free an equivalent amount of grain. The tree being chiefly grown for ornamental purposes occurs most freely in towns and private gardens. In some towns it is the practice to remove the young nuts from the trees in July so as to prevent them from being stoned and broken by boys later on when the "conker" demand begins. Urban authorities and park-keepers must discontinue the practice this year. Chestnut Day, early in next autumn, will have a far wider observance and significance this year than any Chestnut Sunday at Bushey, or than Arbor Day over here, or even in America. For once the small boy will collect the nuts with the full approval of the owner.

To prevent any misapprehension it should perhaps be made clear that the horse chestnuts will not themselves be used as food. They are required for another purpose altogether, and the only way in which they will help the food supplies of the country is by setting free cereals which have now to be consumed in the production of a necessary article."

THURSDAY, SEPT. 6, 1917.

Meeting called to order at 9.30 A. M.

The Nominating Committee reported the renomination of all the officers. The Secretary was instructed to cast one vote for these candidates.

[Carried.]

Moved and carried that the selection of the time and place for next meeting to be left to the Executive Committee with especial consideration of a joint meeting with the National Association at Albany, Georgia.

SOME INSECTS INJURING NUT TREES.

BY W. E. BRITTON, STATE ENTOMOLOGIST, CONNECTICUT.

Nut-bearing trees, like other kinds of trees, are attacked by insect pests. Some kinds are seriously injured by them; others scarcely at all. Some of these insects are borers in the trunk and branches; some devour the leaves; some feed inside the nuts and ruin them; some suck the sap from the stems and leaves.

I shall make no attempt in this paper to enumerate these pests. Time forbids. I shall only mention a few of the most obvious and most serious, and where possible, point out control measures.

THE WALNUT CATERPILLAR.

Datana integerrima G. & R.

During the month of August clusters of blackish caterpillars bearing white hairs, may be seen stripping the terminal branches of black walnut, butternut and hickory trees. This is called the walnut caterpillar, and it has been very abundant in Connecticut this season. Many small trees have been entirely stripped and large ones almost defoliated. There is only one brood each year in Connecticut, though two occur in the southern states, and the pupae winter in the ground. The adult is a reddish brown moth, having a wing-spread of about one and one-half inches. Clipping off the twigs and crushing the mass of caterpillars is perhaps the simplest control method on small trees. Spraying with lead arsenate will prevent defoliation.

THE FALL WEB-WORM.

Hyphantria cunea Drury.

Though a general feeder attacking all kinds of fruit, shade and forest trees, the fall web-worm commonly feeds upon the foliage of nut trees, especially hickories, causing considerable damage in the South. The adult is a white moth, having a wing-spread of an inch or more, appearing in midsummer and laying its egg-cluster on the under side of a leaf. The young caterpillars make a nest at the end of a lateral branch by drawing the leaves together with their webs. These nests usually appear in July and August, though in Connecticut there is a partial second brood and usually a few nests of the early brood may be found in June. In the South there are two complete generations. When the larvae have exhausted their food supply, they extend their nest by taking in fresh leaves, but always feed inside the nest, differing in this respect from the tent caterpillar which makes its nests here in May. When fully grown the caterpillars are about one and one-fourth inches long, with brown bodies covered with light brown hairs, and may be seen crawling about seeking a place to pupate. They soon go into the ground where they transform, the adults emerging the following year.

The best remedies are (1) clipping off and burning the nests when small, and (2) spraying the foliage with arsenical poison.

THE WALNUT BUD MOTH.

Acrobasis caryae Grote?

Inconspicuous nests containing small caterpillars are often found at the ends of the new shoots of *Juglans regia*, seriously injuring them, and sometimes killing the trees. One small tree two feet high was killed, and thirty-five pupae were found in the nests at Dr. Morris' farm in 1912. The adult is a small gray moth with a wing expanse of about three-fourths of an inch. There are three broods each season in Connecticut, the larvae appearing about June 1, July 10 and August 18.

By spraying the foliage with lead arsenate (3 lbs. in 50 gals. water) this insect can be controlled. One application should be made about June 1, followed by a second about July 10.

Though this insect is thought to be *Acrobasis caryae* Grote, it is often difficult to distinguish some of these species in this genius without a knowledge of their food habits and seasonal life histories. We possess such knowledge regarding this species which we have studied and reared in Connecticut, but it is lacking in connection with adult specimens in the United States National Museum labeled *caryae*, which superficially seemed identical with ours. Further study, therefore, may prove this to be an undescribed species. There are other bud-worms attacking nut trees, especially in the southern states, where they cause considerable damage to pecans.

THE WALNUT WEEVIL OR CURCULIO.

Conotrachelus juglandis LeC.

Probably the most serious enemy of *Juglans*, in Connecticut at least, is the walnut weevil or curculio, *Conotrachelus juglandis* LeC. The larvae tunnel in the tender shoots, often ruining the new growth, and they also infest the nuts. The adults feed upon the shoots and leaf petioles. Observations on the different hosts indicate that *Juglans cordiformis* and *J. sieboldiana* are preferred, and the most severely injured, followed in order by *cinerea, regia, nigra* and *mandshurica.*

Though described as early as 1876, little was known about the life history of this insect until the studies were made at the Station in 1912 by Mr. Kirk and the writer. Formerly it was supposed that this insect attacked and injured only the nuts or fruit, and Dr. Morris in 1909 seems to be the first on record to observe the injury to the shoots of *Juglans regia.* It was on the trees of Dr. Morris here in Stamford and those of Mr. H. L. Champlain at Lyme that the life history studies were made. There is but one brood each year, and the winter is passed in the adult stage. The beetles appear the latter part of May and feed upon the stems and leaf veins during the egg-laying period, which extends from the last week in May up to August 1st. The eggs are laid in irregular crescent-shaped punctures, similar to those of the plum curculio, and hatch in from six to twelve days, depending upon the weather.

From four to six weeks are necessary for the development of the larvae, and when mature they go into the ground where they remain for about ten days an inch or so beneath the surface. They then pupate, and from sixteen to twenty days later the adult beetles emerge. They fly to the trees and eat small holes chiefly at the base of the leaf petioles, but must early go into winter quarters as they are seldom seen after the first week in September.

This insect occurs throughout the Eastern United States, but seems to cause more injury in Connecticut than has been noted elsewhere. The remedy is to spray the new shoots and under side of the leaves about June 1, with lead arsenate (6 lbs. of the paste in 50 gallons of water), to kill the beetles when feeding on the leaf petioles.

THE NUT WEEVILS.

Balaninus sp.

Several kinds of nuts are attacked and injured by long-beaked snout beetles or weevils belonging to the genus *Balaninus,* the chestnut probably being the most seriously damaged. All of them feed inside the nuts or fruit during the larval stage, and the larvae are without legs. As both the methods of attack and the life history are similar for all species, they will be considered here in a group. For the sake of distinguishing them, however, their names are mentioned.

Larger Chestnut weevil, *Balaninus proboscideus* Fabr.
Lesser Chestnut weevil, *B. rectus* Say.
Hickory nut or Pecan weevil, *B. caryae* Horn.
Hazelnut weevil, *B. obtusus* Blanch.
Common acorn weevil, *B. quercus* Horn.
Mottled acorn weevil, *B. nasicus* Say.
Straight-snouted acorn weevil, *B. orthorhynchus* Chittn.
Sooty acorn weevil, *B. baculi* Chittn.
Confused acorn weevil, *B. confusor* Ham.
Spotted acorn weevil, *B. pardalus* Chittn.

All of these weevils pass the winter in the ground in the larval stage, transforming to pupae about three weeks before the adult beetles emerge, which varies from June, when they are usually few and scattering, to September, when they have become abundant. Thus there is a single brood each year, and the larval period lasts from three to five weeks in the nuts and some ten months in the ground, from two to eight inches below the surface.

The control of these weevils is difficult, and ordinary methods such as spraying are not effective. In fact little can be done other than destroying the weeviled nuts, which may be fed to hogs. When first gathered the nuts may be fumigated with carbon disulphide. About two fluid ounces of the liquid should be used for each bushel of nuts and placed in a shallow dish on top of the nuts, which should be enclosed in a tight box or barrel. The period of fumigation should be from 12 to 24 hours. Where nuts are not to be used for seed they may be thrown into boiling water for about five minutes—just long enough to kill the weevils. The nuts are then dried and sold. Most of the weeviled nuts will rise to the surface and may be discarded, but this test is not absolute and cannot be depended on to distinguish the sound from the weeviled nuts.

Hickory Bark Beetle or Bark Borer.

Scolytus quadrispinosus Say.

Outbreaks of the hickory bark borer occur periodically throughout the northeastern United States, and during the past five years many hickory trees in this vicinity have died.

The adult is a small black beetle appearing in May and June, which eats holes in the axils of the leaf stems causing them to fall early—usually in July and August. Brood galleries are then made longitudinally just under the bark of the trunk by the female, and a row of eggs is placed along either side of this brood chamber. On hatching the grubs, which are at first very small, tunnel at right angles to the central chamber, each making its own separate gallery. These galleries never meet or cross each other, but must necessarily diverge toward their extremities as they become larger. The effect of this is to girdle the tree which soon dies. The larvae pass the winter under the bark, finish their development in the spring, pupate, and the adults emerge in May and June from small round holes about the size of bird shot.

For control measures, Dr. Hopkins advises examining the trees during the fall and marking all dead and dying trees within an area of several square miles. Then between October 1 and May 1, cut all such trees and dispose of the infested portion to destroy the insects before the adults emerge.

Many forms of treatment have been devised and recommended by tree doctors for the control of this insect. Some of them may be worth trying; most are of doubtful value, and some are absolutely injurious to the trees. On July 3, 1914, some affected hickory trees on the Station grounds were sprayed heavily with powdered lead arsenate, 4 lbs. in 50 gallons of water, to which one pint of "Black

Leaf No. 40" was added. Two days later many dead beetles were found on the tar walks under the trees, and a few were observed each day up until about the middle of August. Most of the trees treated, however, had been so badly injured by the insect that they were removed. Since then this insect has caused little damage on the grounds, though a few hickory trees still remain. In 1901 an outbreak of the hickory bark beetle caused the death of 110 trees on the Hillhouse place in New Haven; then the destructive work of the insect ceased and the few remaining hickory trees are still standing and in fairly good condition. I mention these instances to show that nature's control methods through parasites and natural enemies is far more effective with certain pests than any which man has yet devised. Of course, we hope that in the future man will make better progress along this line.

THE PAINTED HICKORY BORER.

Cyllene pictus Drury.

There are several borers attacking the wood of the trunk of the hiskory, but one of the commonest is the painted hickory borer. It also occasionally attacks black walnut, butternut, mulberry and osage orange. In hickory especially the larval tunnels are often found in the wood when trees are felled. There is probably one brood annually and the winter passed in the pupa stage, though it may possibly hibernate as a larva. Its life history is not fully understood. It is a common occurrence in Connecticut, and specimens are sent me every year, for the adult beetles to emerge in March from firewood in the house or cellar and crawl about seeking a chance to escape. The housewife fears that a terrible household pest has descended upon her, and with fear and trembling invokes the aid of the Agricultural Station.

The beetles appear outside in April and May, and probably oviposit soon afterward. They are about three-fourths of an inch in length and are black, prettily marked with golden yellow.

The insect can be controlled only by the old arduous methods of digging out, and injecting carbon disulphide into the burrows.

Several other long-horned beetles are borers in the hickory and other nut trees. Then, too, the leopard moth, *zeuzera pyrina* Linn., and the carpenter worm, *Prionoxystus robiniae* Peck, may be found occasionally in most any kind of tree.

The chestnut tree (if it has thus far escaped the blight or bark disease) may show small, deep tunnels into the wood of trunk and branch, made by the chestnut timber worm, *Lymexylon sericeum* Harr. Slow-growing woodland trees are more apt to show these galleries than trees of rapid growth standing in the open.

There are a number of tussock moths, sawflies, beetles, etc., which feed on the leaves of nut trees. Spraying with lead arsenate will prevent damage. There are also many sucking insects attacking them, such as the hickory gall aphis, and several species found on the leaves. Some of these may be controlled by spraying with a contact insecticide such as nicotine solution or kerosene emulsion.

In the Southern States, pecan trees are attached by some of these insects which I have mentioned; there are also many more which cannot even be mentioned in the time allotted to this paper. Information may be obtained regarding them, by any one interested, and for this purpose I have appended a short list of publications.

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A MEMBER: Early in the spring I noticed something on the hickory trees swollen and bright red in color, so that the trees were conspicuous from a distance. Later insects emerged which appeared to be these little gnats that fly in swarms.

Dr. Britton: From the description I am not able to say what it was, but it was probably one of those gall flies, a great many species of which exist and which attack all kinds of plants. They do not, as a rule, cause very serious damage, and I can not suggest any particular remedy. Did it interfere with the growth of the tree?

A Member: I noticed what seemed to be the same insect on the grape vines.

Dr. Morris: I would call attention to one pest that is very destructive to hazels; unless watched closely it will produce serious injury. That is the larvae of two of the sawflies. Dr. Britton was unable to determine off-hand the species of the specimens I sent him, but you may know the sawfly larvae by their habit of collecting in a row like soldiers around the edge of the leaf and when the branch is disturbed, their heads and tails stand up. These sawfly larvae need looking after and can be killed by spraying. They usually collect on two or three leaves at a time.

I would like to ask about a bud worm that attacks the leaf of the hickory near the axil, sometimes very extensively, but not very injuriously. At the same time it makes deformities. Colonies of this insect select certain trees, for instance, the Taylor tree that you saw yesterday is infected with this particular bud larva. The base of a petiole becomes enlarged two or three times, and you will find one white worm at the bottom. This colony is confined to this one tree, and the very next tree adjoining the Taylor has its branches interwining, but is not bothered at all, so far as I can determine.

This colony habit is also true of the hickory nut weevil—the hickory weevil makes the Taylor tree a colony house, whereas I haven't found a single weevil in nuts of the adjoining hickory tree that has its branches interwining.

That colony habit is, perhaps, a weak point with the weevil, and it may enable us to eradicate them by concentrating our attention upon their colony trees.

One point in regard to the chestnut weevil. When our chestnuts began to die here, I supposed that the chestnut weevils would immediately turn to my chinquapins for comfort. Weevils attack the chinquapins so extensively in the South that Mr. Littlepage said chinquapins would not be acceptable to Dr. Kellogg because they furnished so much animal diet. (Laughter). Curiously enough, the chestnut weevils did not go to my chinquapins. These chinquaqins bear full crops, heavy crops, and one will almost never find a chestnut weevil in the nuts. I have found now and then a little weevil, about half a dozen altogether, that attacks the involucre at its point of attachment to the chinquapin. This looks like the chestnut weevil, but perhaps, only according to my eye, very much as all Chinamen look alike to one who has never seen them before.

The matter of carbon disulphide for the painted hickory borer. I have used that apparently successfully, but I didn't tunnel through six feet of hickory tree afterward to see whether the borers were dead or not. It is a successful treatment for apple borers. I have no trouble with the apple borers now. I simply clean off the entrance of the hole, the "sawdust," and then with a little putty spread out with my hand make a sort of putty shelf below the hole, then I squirt in a few drops of carbon disulphide with a syringe, turn up the putty and leave it adhering to the bark, closing the hole. You can do that very quickly, and it spares a good deal of perspiring and backache.

The black walnut. On one of my black walnut trees there is a serious pest, a very little worm which infests the involucre. The black walnuts of this tree fall early. I found that same worm last year also extending to the Asiatic walnuts, so that a great many Japanese walnuts fell early as the black walnuts fall, as a result of this little worm's working in large numbers within the involucre. I sent some specimens to New Haven for the species to be observed. This will be a very serious matter if it is going to involve the English walnuts as it does on Long Island. I have found the same thing, apparently, on Long Island in the black walnut, in the English walnut, and in the pecan. It causes a serious drop of these nuts at Dana's Island, near Glen Cove, Long Island.

THE EXTENT OF THE HARDY NUT TREE NURSERY BUSINESS.

R. T. Olcott, New York.

For obvious reasons this subject may well be considered as constituting a gauge of commercial nut culture in the North; it is therefore of much more importance than the mere title would suggest. If there is merit in all that has been preached regarding the planting of budded and grafted trees instead of seedlings; and if it is still true, as we have long observed, that the propagation of named varieties of nut trees, and especially of hardy nut trees, is successful almost solely in the hands of experts, the progress of commercial nut culture in the northern states rests largely in the hands of the nurserymen. We may even go further and assert that it rests for the present mainly in the hands of a few nurserymen who have persistently studied the problems pertaining to the taming of a denizen of the forest, and have persevered with experiments in the face of repeated failure; for, as editor of the *American Nurseryman,* I am in a position to state that with a few exceptions nurserymen generally have not attempted to prepare to supply a demand for hardy, northern-grown, improved nursery nut trees. Seedling walnuts and hickories have been procurable for years from nurseries all over the country, as is shown by nursery catalogue listings; and at least two concerns—one at Lockport, N. Y., and another at Rochester, N. Y.,—have advertised nut tree seedlings extensively, despite the universal nursery practice of budding or grafting or layering practically all other kinds of trees and plants offered for sale as nursery stock—simply because it is not easy to propagate nut trees, and these nurserymen would take advantage of the growing demand for nut orchards.

Within established nut circles all this is commonly known. It was my purpose in referring to these conditions to direct the attention of those not posted to what has been done by a half dozen or more conscientious nursery concerns in an endeavor to supply material of quality for the starting of nut orchards or the planting of isolated trees in response to the arguments set forth in behalf of nut culture. My subject lies at the very base of the formation of this association; for was it not with the idea of directing into safe channels interest which might be aroused in nut culture that the pioneers of the industry in the North organized and convened repeatedly to select and propagate and recommend certain varieties? As the result of years of concentrated effort selections have been made and varieties have been named—and to some extent recommended—throughout the northern states. Now and for some time past the public has had opportunity to purchase and plant carefully grown budded and grafted true-to-name nursery nut trees of varieties having in the parent trees exceptional characteristics deemed sufficient to warrant propagation and dissemination. I need not go into the matter of years of patient effort on the part of a few nurserymen and of a few investigators who entered the lists solely for the love of Nature's developments.

This, in brief, is the rise of the hardy nut tree nursery business. Now, what of its extent? There are upwards of two thousand propagating nurserymen in the country, but those who have made a specialty of hardy, northern-grown nut trees are few. They include the Vincennes Nurseries, W. C. Reed & Son, Vincennes, Ind.; the Indiana Nurseries, J. Ford Wilkinson, Rockport, Ind.; the McCoy Nut Nurseries, R. L. McCoy, president, Evansville and Lake, Ind.; the Maryland Nurseries, T. P. Littlepage, Bowie, Md.; J. F. Jones, Lancaster, Pa.; J. G. Rush, West Willow, Pa.; C. K. Sober, Lewisburg, Pa., and some in the northwest.

As showing the extent of the business, Mr. Reed, of Vincennes, reports demand for nut trees increasing. He had to return orders unfilled last spring. His nurseries have 3,000 to 4,000 Persian walnut trees and about the same number of pecan trees for fall sales; also about 1,000 grafted black walnut trees. There are growing in the Vincennes nurseries ready for budding and grafting 50,000 black walnut seedlings and 50,000 pecan seedlings. Mr. Reed said recently: "Owing to the extreme difficulty of propagating nut trees in the North, I think the demand will keep up with the supply."

Mr. Jones sold last year about 8,000 nut trees which went to points all over the country; not many to California, or to the far South; a good many to New Jersey, New York, Maryland, Virginia, West Virginia, Pennsylvania, Ohio, Indiana, Illinois, Missouri, etc. The largest order was for 600 trees. A number of orders were for 100 to 300 trees. New Jersey leads in planting, he finds, with Virginia a close second, in large orders. In small orders Pennsylvania leads with him.

Mr. McCoy has done a great deal of experimenting with grafts and he is still at it. He has 40 acres mostly under nut tree cultivation, and has a considerable number of trees for sale.

Anyone who has seen the handsome nut tree catalogue issued by Mr. Littlepage, of the Maryland Nurseries, must have been impressed with the great care taken to produce the attractive trees and nuts there depicted. These nurseries have been recently established and not a great number of trees have yet been offered for sale, but Mr. Littlepage has 150,000 seedling nut trees in his nurseries for propagating purposes.

Mr. Sober's nurseries are devoted almost entirely to the cultivation of chestnut trees. Mr. Rush's specialty is the Persian walnut. Mr. Wilkinson naturally specializes in Indiana pecan trees. At Rochester, N. Y., James S. McGlennon and Conrad Vollertsen have produced interesting results with filberts imported some years ago from Germany. They have five-year-old bushes bearing; these have proved hardy in every way and they have no blight. The nuts compare favorably with the best of the imported kinds. Nursery stock will soon be ready in quantity, and they now have 500 plants suitable for transplanting.

Filbert and walnut are the only nut trees grown commercially to any extent in the nurseries of the northwest. A few almond and chestnut trees are grown there, but the demand for them is very light. J. B. Pilkington, Portland, Ore., a well-known grower of a general line of nursery stock, advertises French, Japanese and Italian chestnut trees and the American Sweet. Filberts are being produced to a considerable extent. At present the nurseries cannot supply the demand for filbert plants, owing to the limited number of mother plants in the northwest. Practically all the nurseries have Barcelona and Du Chilly for sale, and a number have the Avelines. From one nursery or another De Alger, Kentish Cob and a few other varieties can be had. Persian walnuts are grown on a larger scale. Groner & McClure, Hillsboro, Ore., are the largest exclusive walnut nurserymen in the northwest. They produce close to 6,000 grafted trees annually. These sell at 90c. to $1.00 per tree in lots of 100. The Oregon Nursery Company, Orenco, Ore., produce a large number of both grafted and seedling walnut trees, asking up to $2.00 per tree for grafted and 35 to 50c. for seedlings. Many of the smaller nurseries procure their nut trees from California nurseries. Each year the proportion of seedlings planted is less. Franquette is the popular variety that is propagated.

The Northern Nut Growers' Association and one or two other similar organizations have labored for years to extend interest in nut culture. The files of the secretary of this association will show in heaps of letters and piles of newspaper clippings the marked success in view of the means that were at hand. And it has all been upon a high plane. The campaigns have been marked by the utmost degree of conscientious effort to arrive at the truth regarding adaptability of varieties and cultural methods. This work is still in progress—indeed, the need for it will never end. But in the opinion of the writer there should from this day go hand in hand with investigation and experiment a very practical application to orchard purposes of what has been learned. The sooner northern nut trees come into bearing in grove form the sooner will general interest in nut culture increase. I would urge constant effort in that direction; even, if need be, to the exclusion of some of the further study on varieties.

There are now grown in northern nut tree nurseries approved by this association named varieties of pecans, Persian walnuts, black walnuts, hickories and some other nuts amply sufficient to start orchards. The pecan growers of the southern states selected and experimented and discussed for a time—and then they planted. Mistakes were made, but these were discovered quicker by grove planting. Now they are shipping improved varieties of pecans by the carload, at $12,000 per car. Naturally interest in pecan culture in the South is widespread. With bearing orchards of nut trees in the northern states, similar interest will be manifested; and then we shall all see the real progress which comes of producing commercial results. Has not the time arrived to put into practical operation what has been learned in the last eight years? I believe this association could wisely consider the policy of confining discussion in the open session of its annual meetings to topics relating to behavior of varieties in orchard form and commercial cultural methods—at least to the handling of the planted tree by the public, whether isolated or in orchard rows—and reserve for executive sessions the discussion of varieties and methods not yet at a stage for formal endorsement by the association. It seems to me that any other policy obscures the issue which, I take it, is to foster the extension of nut culture. How can nut culture be practically extended if the public is constantly confronted with features of the experimental stage? Persons mildly interested in nut culture, as the result, perhaps, of association propaganda, drift into our meetings or make ad interim inquiry and receive for membership enrollment, or otherwise, printed matter relating almost wholly to experimentation in nut work. No wonder their interest wanes a short time afterward and many of them are not heard from again. What most of them expected was information as to varieties of improved nut trees available, where to get them and how to treat them when planted. Discussion by the experts is not for them; they will reap the result of that in due time.

Now, the extent of the hardy nut tree nursery industry is directly dependent upon all this. If that extent is not yet great, it is due undoubtedly to the newness of the industry. But it is also due in part to conditions which have been referred to. I wish especially for the purposes of this address that this association were an incorporated body so that I could speak of it as such and not seem to be criticising individuals. What has been done by our officers and members has been very necessary. It is of the future that I speak.

Nut brokers, wholesale grocers and manufacturers of confectionery are calling for crop and market reports of nuts. A letter from a large commission house in San Francisco, importers and exporters, says that what is wanted is information as to growing crops of nuts and market conditions. Other brokers and dealers ask the same thing. The *American Nut Journal* has given crop and market conditions of southern pecans and California walnuts and almonds; and, in peace times, of foreign nut crops. What else is there to give? The native nut crop? But that concerns this association about as much as the blueberry and huckleberry crops of the Michigan and Minnesota barrens concerns the horticultural societies and the National Apple Growers. What the brokers, wholesale grocers and commission merchants want is crop and market reports on cultivated nuts. But where are they? The public and the middlemen are calling for nuts. And these people write that they are not interested in cultural methods.

The hardy nut tree nursery business is what it is and will be what it will be just in proportion to the character of the crop and the market report. Interest in nut culture generally will lag or increase in just the same ratio. This is the eighth annual convention of this association. Will the sixteenth annual meeting see a greatly augmented membership without a practical incentive?

I have said that this association has recommended to some extent the planting of nut trees—the named varieties. I believe that what is needed is a publicity campaign bearing upon the planting of the varieties now on the market. When other varieties come on they may receive proper attention. Native nuts are in great demand. The varieties considered by this association are the best of the natives. Is that not sufficient basis to proceed on? Has not this association officially endorsed the varieties grown by the nut tree nurserymen we have referred to, by officially endorsing those nurserymen? Having endorsed the named varieties grown for sale by the nurserymen on its approved list can this association consistently do otherwise then to urge without hesitation the planting of those varieties by the public?

Dr. Morris: Mr. Olcott spoke on the almonds of the Pacific Coast. Here in the east it was said yesterday that only hard shelled almonds would thrive. That has been my experience with one exception. I got from a missionary some soft shelled almonds of very high quality and thin shelled. There were about twenty of those almonds. I ate two and planted the rest. The ants enjoyed the sprouting cotyledous of all but one. That one lived and thrived and grew in two years to a height of about four feet. In its third winter it was absolutely killed. Now that means that somewhere in Syria there is a soft shelled almond of very high quality that will live three years in Connecticut according to accurate record. It may live fifty years here if well started and protected when young.

THE CHAIRMAN: You showed us some hard shelled almonds I believe from your place.

DR. MORRIS: The hard shelled almonds do pretty well on my place if looked after. I have had trees that bore nearly a bushel each, but the chief difficulty is due to the leaf blights. Almond trees are quite subject to leaf blights. As long as I sprayed the almond trees frequently they did well but I had several other things to do and couldn't keep it up.

A MEMBER: The Association has a list of nurserymen who are reliable and who will furnish reliable trees. It occured to me in line with the spirit of Mr. Olcott's paper, if it would be practicable, for the Association to get up a little paper on approved varieties of trees for planting. That may seem foolish to suggest but a good many members who come in here are very green on the subject of nut growing. It may have been done but if it has I am not familiar with it.

THE SECRETARY: A good many requests are received by the secretary for information as to what nut trees to plant. My advice usually is that they get the catalogues of all the different nurserymen on our approved list and select from those catalogues as many nut trees of each variety recommended by the nurserymen as they wish and give them the best cultural conditions they can. I don't see that we can recommend any particular varieties. There are few enough grafted varieties of nut trees obtainable, and I do not see that we can, as an association, recommend any particular varieties. I would like to have suggestions.

MR. OLCOTT: I don't think it is advisable for the association to go into that detail. I think that as the association has endorsed a list of nurserymen, so long as those nurserymen keep within boundry and retain that endorsement that is sufficient guarantee to the public.

MR. REED: We cannot recommend the different varieties because they have not been tested out and fruited. In the National Nut Growers' Association data are obtainable because they have been worked out by experiment stations and by individuals. But in this association where varieties are just being discovered and have not been disseminated and tried we have got to test them. We haven't got developed beyond the infant class in this Northern Nut Growers' Association.

A MEMBER: I realize that the thing is in an experimental stage, but since I have been at this meeting I have been asked by two different people here if I could give them any information as to what varieties to plant. That is a very live question for a person here for the first time and he wants a primer.

THE SECRETARY: We had a circular, now exhausted, giving the best information known at that time. It gave the method of procedure from the cultivation of the land until the nut trees were advanced several years in their growth, covering it in detail in so far as it lay in the secretary's ability to give it at that time. The same advice perhaps would not be given now but it would be practically the same thing. It may be desirable that we reprint something of the kind for the person who wants to begin the cultivation of nuts and has no knowledge on the subject.

MR. JONES: I think the association might do something of the kind. We could have a map of the states for instance, and have that outlined in belts and varieties specified that would be somewhat likely to succeed in those belts.

MR. CHAIRMAN: I think it is only a question of time when that will be done. In the National Association that has been worked out, what they plant in Florida what they plant in west Georgia, what they plant in Mississippi. and what they plant in all the different sections. I think it is only a question of time when it will be worked out by this asociation. Every year will bring in new data. You will find in the National Nut Growers' Association that good reports on new varieties of nuts from year to year keep accumulating. From that we get data very definite for certain varieties. I expect the members of this association will know lots of them. They have become past history in nut growing in the south. We have got past those poor things and in to something that is definite and satisfactory.

MR. BARTLETT: Would it be possible and advisable for the association to have such a thing as an experimental orchard, provided they could get somebody to take care of such a place? There is a man in this room who has plenty of room and facilities for taking care of an orchard.

THE CHAIRMAN: That is worthy of attention but I do not know whether the association is in a position to take care of it. In my paper yesterday I spoke about putting it up to the experiment stations.

COL. VAN DUZEE: The experiment stations are at the service of the people and if you will call upon your stations repeatedly they will respond eventually. It is going to take some little time but it seems to me that they are the logical people to carry it out. We have found in the south that the behaviour of varieties in different localities was so different that we have been obliged to wait until each locality had something of history to guide us. I suppose it would be a very good plan if all who are interested in nut culture in the North would convey the information to their experiment stations that they are desirous of having these orchards established. Eventually the country could be covered with little experimental plots where the information obtained would be reliable. where the work could be under the supervision and inspection of people who are paid by the state for that purpose.

Now in regard to the publicity. We have followed a plan for a number of years in the South of publishing frequently what we call Nut Notes. They were gathered together by the editor of the Nut Grower. Whenever an item of interest to the public came to him in his exchange and from any other source, he made a paragraph of it and then at the end of the month, or perhaps two months, he would publish a little circular "Nut Notes," and that would be run off in some large number, and distributed to the nurserymen, or other interested people, and they would simply enclose it in their correspondence. They would send them to the local papers all through the South so that the things that were found worthy of dissemination in the way of new records and new ideas were constantly being sent to the local papers and to the interested people in that way. I have a vast sympathy for Dr. Deming. He is not drawing a princely salary and he has a lot of things to do. I know his heart is in this work and he would be glad to do these things but he must have help. These two ways I suggest to you are ways we have found in the South to accomplish a considerable work. Make a demand upon your experiment stations that this work be taken up and get Mr. Olcott to print the slips and then get the nurserymen who are interested and the local newspaper people to publish the nut notes that become available from time to time.

MR. OLCOTT: I have knowledge of these circulars of Nut Notes sent out by Dr. Wilson in the South and have thought of doing something like it but have not gotten at it yet. I have exchanges and notices coming in that could be summarized just that way and even more extensively but I haven't had time to do this work.

THE SECRETARY: I think this proposal of Mr. Bartlett's is very important and I promise Mr. Bartlett and Mr. Barrows that all the members of this association will help. I am sure Dr. Morris will be glad to give advice about planting this orchard. I haven't the slightest doubt that Mr. Reed will go there in his position as Nut Culturist of the Department of Agriculture. I think we ought to go ahead and do that without waiting for the Connecticut authorities, but at the earliest opportunity begin to try to interest them. They are not interested enough to go into it now. Some of the members of this association have got to start this thing and then we have got to interest the men at the agricultural experiment station. Two of them were here yesterday and have expressed their interest in the subject. We hope eventually that they will take full charge of such work which really ought to be in the hands of self perpetuating institutions and not in the hands of individuals. I can assure Mr. Bartlett of the hearty co-operation of this association in any planting of that kind and I wish that the steps might be taken at once to begin such a planting.

DR. MORRIS: I would be only too glad to give him some trees to start with.

MR. JONES: The nurseries growing these trees would be glad to cooperate and supply these trees at reduced prices for this experimental orchard.

THE CHAIRMAN: There seems to be lots of interest in this matter but it ought not to be on a voluntary basis. It might be interesting to you to have an idea of how we have done that further south. In North Carolina we have definite nut projects on our experiment station's list. The work is outlined and funds appropriated for carrying it out, and workers and funds are assigned to that particular project. They have a regular definite program and when a project is once begun that project has to be reported on. It cannot be discontinued. It has to be continued until it is worked out. In that way we are getting something definite and we have some machinery to work with. At first we had no commercial nut growing. We instituted a nut survey of the state. We issued instructions for our extension men to look out for nut trees on the farms. Then we made a list of the growers and orchards. There we made experimental planting and we made them in every section of the state so as to find out what varieties were best for the different sections. We had difficulty in finding varieties for all of our conditions. We had experiment orchards in all of the various sections of the State which have been conducted now for ten years and we have very definite data. The man who writes in to me for information can be answered shortly. Every year we are getting new data. I think every tree that we can get from any nursery catalogue that I can find is in those experimental orchards. Every year eliminates a few. If the stocks are good we work them over. There is no uncertainty about it. It is either a positive or a negative result. These results are published just as soon as they can be. It is part of our experiment work just as we experiment with cotton or apples or corn. I made a suggestion in my paper for work of this kind here and I thought it would be picked up by the Committee on Resolutions, but it was not acted on. To get this matter crystallized and get it to the attention of the experimental station I think that the secretary ought to be empowered to write officially to the directors of the experiment station in the various states asking that a nut survey be made of those states and that nut projects be entered upon and especially the testing of the varieties that have been found in the various states.

Dr. Britton: Representing the Connecticut station I can say that the men there will be glad to help you, but they are in the same position as Dr. Deming, doing all they can at present, more than they ought to do, and most of the funds for that reason are arranged for in definite projects. That being the case, it will be necessary to provide for a future appropriation. During his war we are all short handed. I have four young men working in my department who have not had a day's vacation this summer—more work than they can do. At present we have no one connected with the station who is a specialist on nuts, and it would mean getting in a man to work up this subject. But I think that can be brought about in time. Of course if the legislature is asked for any appropriation, this association or those interested in growing nuts would have to help get the appropriation for the state.

The Secretary: Prof. Hutt is State Horticulturist of his state and he is also a specialist on nuts. He lives in a state where nut culture is much further advanced than it is here, consequently it has been, it seems to me, a good deal simpler for him to accomplish results there than it is for us here. I approve of grasping this opportunity and going ahead with it and at the same time following up the suggestions of Dr. Britton of trying to get the appropriation in order to enable the agricultural experiment station to take action.

Mr. Olcott: I move that the secretary be asked to communicate with the experiment stations in the various states along just the lines you suggested for the purpose of getting started.

The motion, duly seconded, was passed.

Mr. Olcott: I would like to make another motion that the association do whatever it can to take advantage of this opportunity that Mr. Bartlett has just spoken about, and I would move that the matter be put in the hands of the secretary with power to act.

Mr. Webber seconded the motion and it was carried.

NUT TREES FOR SHADE.

Francis A. Bartlett, Connecticut.

Were we to limit our shade trees to those trees which alone produce edible nuts we would then have a greater assortment of trees than one could hardly suppose, and not only would be varieties be numerous but they would embrace many of our most noble and most beautiful trees.

Let us consider the varieties from which we may draw. In so doing let me ask why, with all these trees, we really need other trees which in themselves are no more ornamental and are non-producing.

Of the oaks there are many, while the nuts or acorns are seldom eaten by man, yet they have often composed his diet when other foods have failed. In many parts of the South this nut has been the principal food used in the fattening, or possibly the sustaining food, of the native razor-back hog.

Our native beech produces the small triangular nuts which have been sought by the boys and girls of centuries and are as popular today as of hundreds of years ago. The beech will grow to immense size and may live sometimes for centuries. A beautiful bright smooth foliage makes it very desirable as a park tree and it does not lose its charm in winter. On an extensive lawn it makes a very desirable tree but in close proximity to the house the one objection there may be is that the dead foliage seems to cling to the twigs sometimes the entire winter. This objection is more pronounced, however, in the younger trees than in the older ones.

Our native black walnut is a magnificent tree which can compare favorably with the finest oak in size, in shape, in picturesqueness and above all, in its huge nuts, which are both wholesome and delicious. Were it not for the great value of its wood for making gun stocks and for cabinet work we would today have hundreds of these trees growing, where now but few can be found; yet there are individual specimens with spread of over 150 feet and as magnificent and majestic as the finest oak.

Our native chestnut: let us not think of it in memory only, though the pride of our forests seems to have left us after the scourge of the chestnut blight. Unless the history of all scourges has been upset we will find some tree somewhere sometime that is blight resistant and then from this tree we will produce and propagate the chestnut back to its own. At least, as far as an ornamental and useful nut-producing tree is concerned. Should we find no tree in all this huge area which is disease-resistant we have at least one hope in the chestnut brought from China, where for probable centuries this disease has been present, but unable to destroy its host, the chestnut. Already in this country there are thousands of these seedlings growing which are apparently disease-resistant. The tree itself compares very favorably with our native tree. We will yet grow our favorite chestnuts and our children will yet enjoy them as we have done in the days of our youth.

We must not forget the chinkapin, the little brother of the chestnut, but a better fighter of its enemies, for this latter tree is almost resistent to the blight and will bloom and bear nuts while only a little tree, and the nuts are sweet and good. Then, too, it is not necessary to climb the tree to gather the nuts for the tree being small the nuts can almost be gathered from the ground. For planting over rocky banks and hillsides nothing is more handsome. The dark green foliage dotted here and there with the bright green burrs always attracts favorable attention and comment.

Our butternut, too, cannot be omitted, for there are few better flavored nuts than the butternut. Though hard to crack, this fault, if it may be a fault, will soon be overcome, for we will find a tree with thin-shelled nuts somewhere. They are no doubt present and when we do find such a tree we may all propagate from it. Though the tree is a rather irregular grower and is susceptible to certain bark diseases yet it has its place in the home planting for its compound leaves and light bark always shows prominently in the landscape. This tree sometimes grows to an immense size. At my early home in Massachusetts one huge butternut stood in the yard. Though the tree died long before I became especially interested in old trees I remembr that we counted the annular rings and as near as I can recall the figures for its measurements and rings were 13 ft. in circumference and 80 annular rings. The trunk was perfectly solid and showed no signs of decay. Many bushels of nuts were gathered from this one tree yearly and I can remember the long winter evenings when we sat in the kitchen cracking the nuts from this old tree. Some have said the butternut is unsatisfactory as an ornamental tree but let me add—do not neglect it in the planting plan for it will give you much pleasure, and, too, the meats are well worth the trouble in cracking the nuts even though a bruised finger may result.

To the family of the walnut we are indebted to Japan for the beautiful and tropical foliage of the Japanese walnut, *Sieboldiana*. Although the tree has many characteristics of the butternut the foliage is much more luxuriant and it is an admirable tree for planting in the open lawn. The individual fruit of the *Sieboldiana* walnut is similar in appearance to that of the butternut and is borne in clusters or racemes, sometimes as many as twenty or more in a cluster, and is equal in every way to that of the butternut but the nuts being smaller contain a much less quantity of meat.

The king of the walnuts, *Juglans regia,* sometimes called Madeira walnut, Persian walnut, Spanish walnut and English walnut, is the finest of the nuts as far as the fruit is concerned, and is a handsome tree growing to immense size with large spreading branches and almost tropical foliage. For over 150 years this tree has been growing and thriving in our immediate neighborhood, producing bushels of nuts annually, yet few people whom we have met will hardly believe that the English walnut will thrive in this northern latitude. There is one specimen of this tree today with which I am famliiar in Tarrytown, N. Y., which is over 2 feet in diameter, with a spread of 75 feet or more and nearly 100 feet in height. While the tree has not produced regularly yet it bears a few nuts each year and sometimes numbers of bushels.

The English walnut always attracts attention on account of its symmetrical growth and its luxuriant foliage. As a shade tree there are few better.

Of the nut family the one truly American tree of which we should be duly proud is the hickory, this tree being found in no other part of the world, with the exception of China, but North America. As a park or roadside tree there are few trees that can compare with it,—upright in growth with a beautifully rounded head, sometimes growing to immense size and producing nuts almost annually. Of this group of trees we have the shellbark, shagbark and pignut. The pignut being of little value as far as the nuts are concerned, yet having smaller and possibly more luxuriant foliage than the shagbark or shellbark. The shagbark is the nut most sought for by the younger generations and bids fair to become a nut of considerable importance.

It seems strange that in the long history of the hickory or shagbark more has not been done in the improvement of the nuts in the growing of large thin-shelled and sweeter nuts. Trees bearing such nuts do exist and I think most of us can recall certain trees in our boyhood days that produced nuts of far superior quality than are ordinarily found from the common tree. At least, I can recall one tree from which twenty-five years ago there was produced a very large fine sweet nut which was sought by all the children in the neighborhood. This tree, however, has passed away with hundreds of others, either by the hickory bark beetle or the axe.

It is well to mention the filbert and hazel. While not really trees the filbert sometimes reaches a height of 5 ft. or more with very luxuriant foliage in the summer and in the early spring the catkins are very prominent and attractive. There is no reason why the filbert should not be grown more extensively even though it is affected by blight or canker. We are assured that this can be readily cut away with less trouble than the ordinary treatment of trees.

Of the hazel there are two kinds, the common hazel and beaked hazel, both native here. While the nuts of these shrubs are really too small to be of any commercial value yet I believe we will find nuts growing somewhere that are as large as our imported filberts.

Of the pines and evergreens there are a number which produce nuts of which Dr. Morris has told us. Some of them are rapid growing trees and there seems to be good reason why we should not plant out evergreens which produce fruit and are just as attractive and fine as those evergreens which produce shade only.

I have not mentioned one tree which I believe to be the most promising for this locality—that is the pecan. It has been demonstrated that we can grow the pecan on our native hickories and from what I have seen of the wonderful growth of the first year of the bud I am sure we will be able to produce as fine pecans as can be produced in any section of the country, and further than that, we have an unlimited number of native hickories on which we can graft this finest of nuts. The pecan is hardy in this locality and farther north. I have seen it grown to a fair sized tree in Connecticut. I have seen it on the south side of Long Island and have seen one tree planted possibly over 100 years near Oyster Bay, L. I. which today is more than 3 ft. in diameter and reaches possibly 75 ft. in height. The pecan, too, is fruiting on Long Island and I believe we will have it fruiting in this locality within the next two or three years. During the last few years I have talked with numbers of people, many of them owners of large estates who could hardly believe it is possible to grow the English walnut and pecan in this latitude.

I have said that were we to limit our shade trees to those trees alone which produce edible nuts we would then have a greater assortment than one could hardly suppose. Each and every one of the trees I have mentioned were they not to produce a single nut would in themselves equal or surpass almost any tree in beauty and majesty.

Were we to develop a park and limit the plantings to nut trees alone how attractive such a park might be—the taller trees in the background to be of the black walnut and beech. These trees to be banked with the smaller trees of the butternut and English walnut. Over the rocky places we could plant the chinkapin and hazel. We could then put in specimen trees of the hickory and pecans with groups of filberts, dotted here and there with plantings of nut bearing pines. I believe such a planting would be as attractive as a planting of an added number of our ordinary shade trees. Let us imagine what the return from such a planting might mean to the public or the owners. In fifty years from this time, and in speaking of nut trees looking forward to fifty years is but a comparatively short time, our roadside trees could be replaced by nut bearing trees which are as attractive as any shade tree. I have no doubt that in this city alone were the roadsides planted with nut trees and these received reasonable care the returns from these trees would pay the entire city and town tax.

Dr. Morris: Mr. Bartlett said that the hickory belonged only to North America. That was supposed to be the case until very recently Mr. Meyer, an agricultural explorer, found an open bud hickory in China.

Mr. Olcott: Mr. Bartlett said he hoped the day would come when the filbert and hazels would be produced in this country. I saw last week the report of a crop in Rochester, New York, on five-year old filbert bushes that had been pronounced as good as imported nuts in quality and certainly were in size, and finer in coloring. I have some photographs of the trees on which they grew. These were the trees which were described in detail in a paper read at the National Nut Growers' Association at Nashville last year by Mr. McGlennon, of Rochester. He told me that all he said at that time stands, with the addition that since then he has had proof regarding the absence of blight and the extreme hardiness of the trees and their continued bearing. The trees are grown for propagating purposes and not for fruit, and therefore they are not in their best condition for bearing. Mr. McGlennon is a business man of Rochester, with no special experience except that he became interested in some southern pecan plantings. Afterwards the filbert planting came up and he worked with Mr. Vollertson, who was experienced in this work in Germany. He and Mr. McGlennon imported 22 kinds of filberts from Europe. They are so far blight-proof and extremely hardy and are bearing.

Mrs. Irwin: I would like to say that I do not think there is enough publicity given this organization. There are a number of people, to whom I casually mentioned yesterday, that I had become interested in this thing, but they had not seen the Advocate and knew nothing about the meeting. They are interested, I think, and it seems to me that an organization for growth must have publicity and a lot of it.

A Member: We were discussing this morning why we did not have a larger number of people here from Stamford and Greenwich. It is the merest chance I saw the notice. I have been interested for some time. I think there should be greater publicity because only by large membership can we get the growth and the standing that we want.

Dr. Morris: Even a good many people in the vicinity who knew about this conference and said they would be interested to come, have not appeared. Our meeting came to Stamford this year because there are so many wealthy people interested in horticulture in Stamford and Greenwich. Very large funds are required for development of this subject, experimental orchards, publication and publicity. We believed here we would strike the sort of men to further public interest in the subject. This is by all means the smallest local attendance, however, that we have ever had since the beginning of the Association in any part of the country.

The Secretary: We have never had the advertising more thoroughly done. Mr. Bartlett and Mr. Staunton and Dr. Morris and I have all worked at it; notices have been in at least three of the New York papers, clippings of which have been sent me, and articles in Ansonia and Hartford papers; articles and programs have been sent repeatedly to Stamford, Greenwich, Darien, Port Chester, Danbury, Ridgefield and New Canaan papers. Dr. Morris has written personal letters. And then, too, there are the signs around here. I don't know what other measures could have been taken.

Dr. Morris: My chauffeur, who is in the Naval Reserve, and doesn't know about nuts at all, dropped in casually yesterday, but stayed through the whole session. That shows what interest might be aroused if only you can catch people. No trouble to hold them when captured.

Every person who has come into this association has done so because of something from the heart within.

Mr. Bixby: On this subject of publicity, I have done something in a very humble way that I thought might help, and this year I am planning to do it to a little larger extent. I have been very much interested in the butternut. The concern with which I am associated has a connection with general stores throughout the country, so I sent circulars calling attention to the butternut prizes to the general stores in the smaller towns throughout New Hampshire and Vermont. That circular invited the people who had specimens of butternuts that they thought superior to send them to Dr. Deming, and in the same circular I called attention to the fact that there were prizes for other nuts, and invited them to communicate with Dr. Deming. It was all done in the name of the Association.

PROF. HUTT: When we started our meeting we announced a question box.

THE SECRETARY: We expected to have a revised proof of our question box to be distributed among the audience, but it has not come. I would like to ask any one who now desires to ask questions relative to nut culture to do so and I think he will be able to get answers from members present. I had better begin by propounding a question myself that has been asked often -- what variety of nut trees to plant — and I am going to make a short answer myself, just to bring about discussion. For early bearing, and encouragement to the nut grower, plant chinkapins, hazels, or filberts, many varieties, so that they will pollenize one another, and plant Japanese walnuts, early bearing and beautiful trees. For later results plant Persian walnuts, the Franquette and Mayette varieties, which are old standard ones. If you want to go a little bit more experimentally, plant pecans, say the Indiana and Busseron varieties, both from the Indiana district, and both hardy, though neither of them have fruited here. Plant some black walnuts, say of the Stabler and the Thomes varieties, which are the best known, and plant a few shagbark hickories. There are very few varieties to be had in the shagbark. We don't know much about the Kirtland, although that is one of the best nuts. We know little of the bearing records of these trees. I leave this answer for emendation, addition or correction.

DR. MORRIS: Has anybody any Kirtland hickories in stock grafted for sale?

MR. JONES: 100 to 150.

DR. MORRIS: Have you any Weicker?

MR. JONES: Yes, some are in stock for sale.

DR. MORRIS: Hales's hickories?

MR. JONES: No, not grown.

DR. MORRIS: The Hales' nut is big, too coarse and not very good.

Mr. Jones: The kernel is yellowish.

Dr. Britton: I would like to ask Dr. Morris what time of the year he would advise pruning the Persian walnuts here in Stamford.

Dr. Morris: The editor of a horticultural journal at one time set out to get opinions about the best time for pruning peaches. There were opinions from all points as to whether peach trees should be trimmed in winter, spring, summer or autumn, and summing up all of the replies, the editor said, "We have come to the conclusion that the right time to prune peach trees is when your knife is sharp." I presume that that in a way will apply to almost all trees. Pruning the walnut trees in the spring when sap is flowing freely would not be desirable, I should think. Walnut trees need very little pruning. Very few of the nut trees need pruning, excepting the hazels. These need to be pruned in order to put them in good head. And possibly some of the hickories, but for the most part I doubt if pruning is desirable, save for broken branches. I leave that to Mr. Jones.

Dr. Britton: The reason why I asked the question is that when we were carrying on this investigation with the walnut weevil, we found that when branches were cut early in the spring there was nearly always a bad wound that did not heal over. It died back around the place. But when we cut branches later, from the first to the middle of June, when the growth was taking place, it healed over very smoothly without leaving any bad scars, and I was wondering whether that happened over the region where the Persian walnut was grown.

Dr. Morris: I am glad to have that observation that the wounds did not granulate and heal well. I have noticed that the shag bark hickory cannot be cut well for scions in the spring without injuring the rest of the limb on the tree. I have cut back the Taylor tree's lower branches, in order to cut off scions, and almost every branch from which I have cut scions is dead or dying. That is perhaps in line with the observation of Dr. Britton. Some of the juglandaciae cannot be cut in the spring.

Mr. Jones: I have found that in cutting scions of walnut trees when the sap is running the tree bleeds and makes a bad wound and doesn't heal over. It dies back. But if you cut those any time in the winter when you have say two or three days without freezing, they will not bleed then nor in the spring when the sap comes up. Also, if cut after the growth is well started, they won't bleed very much.

Mr. Weber: Are back numbers of the Journal available?

The Secretary: All of our reports.

Mr. Weber: I would suggest for the benefit of uninitiated persons that they get the back numbers, also send to each of the accredited nurserymen and get a copy of each catalogue and then study the back numbers and the catalogues. They will be pretty well posted, as all the nut catalogues are well illustrated and contain a great deal of information, and it will take them out of the realm of hazy knowledge they now have on the subject.

Mr. Jones: The Government has some excellent bulletins in line with this work.

Mr. Smith: I would like to get some information about spring and fall planting in Massachusetts.

A Member: I advise planting in the spring. Where the ground freezes heavily in the winter, plant in the spring. In the South you don't have any injury from cold.

Mr. Weber: I have planted trees in the fall and the tops winter-kill down to the grafts. I had them wrapped and still they were winter-killed, or else the wrapping killed them. Persian walnuts and Indiana pecans. They threw a good shoot in the spring, however, and made a very good growth.

I move that a vote of thanks be extended to the local committee for making this convention a success, and a rising vote of thanks to show Dr. Morris the appreciation of the convention.

The convention thereupon adjourned.

APPENDIX.

I report on soft shell almonds as follows:

In February, 1914, I ordered from Armstrong Nurseries, Ontario, California, the following trees:

10 four to six ft. Jordon Almond trees
10 four to six ft. I. X. L. Almond trees
10 four to six ft. Ne Plus Ultra Almond trees

The trees were shipped in March of the same year and healed in until May. The farm on which these trees were planted is situated on the south shore of Lake Ontario, in Wayne County, New York. This district is a large producer of peaches and apples. The trees were planted twenty feet apart in a sandy loam soil in line with a young apple orchard. This soil is especially adapted to peach growing. The entire orchard was given clean cultivation with intercrops until the Spring of 1917. For two years potatoes were grown among the trees, and for one year cabbage. The land was limed and fertilized with both natural and chemical fertilizers. Cultivation of the tree rows stopped about the 1st of August, the intercrops about the 15th of September. For the year 1917 the trees were grown in sod. The trees were pruned similar to the peach trees, and have made somewhat less growth than a peach tree would make under the same conditions.

The lake on the boundary of the farm tempers the climate conditions of this location so that the opening of the season is about two weeks later than the average, and the date of the first frost is two to three weeks later. On this account the trees have had a better opportunity to ripen the wood for the winter period after cultivation ceases. During these winters the thermometer has gone as low as four degrees below zero without winter killing those trees which survived. Six trees of the thirty originally planted are now living. All others died the first winter after being set out. Unfortunately, the trees were not labeled at the time of setting out so I am unable to indicate what varieties lived through. Of the six trees living, three blossomed scantily this year, but all the blossoms proved false. I think there is no particular cause for discouragement on this account, as we have the same experience with peach treees. That is, they often bear a number of blossoms the first year, and none of them come to maturity. All the trees appear to have buds for next year. Some of these should develop into blossoms, and unless there is a frost after the blossoms come out in the spring of 1918, there may be some nuts produced. The final test as to whether or not these trees can be brought into bearing, will come next spring. The site upon which the trees are planted, as mentioned before, on account of the proximity of the lake, is more favorable than most locations for peach growing, and if the experience of the peach growers in New York State is any index, there would be little opportunity for success with almond trees, except under similar conditions.

M. E. WILE.

I am pleased to advice that the hardy soft shell pecan trees I have planted in Virginia, and the hardy English walnut trees are all growing finely. I find it just as easy to get a budded pecan tree to grow as it is to get an apple tree to grow. I am telling my friends about this all over Ohio, Indiana, Kentucky and Tennessee as well as Virginia. They have planted a good many trees and all report favorably.

My advice is to plant pecan and English walnut trees as they are just as beautiful and useful for shade as any other kind, and in addition to this they will produce a large amount of the healthiest and most nutritious of food for the human family.

I am very much indebted to the Northern Nut Growers Association for the knowledge obtained along this line. You can rest assured that I will try and pass it along as I go.

JOHN S. PARRISH.

ATTENDANCE

R. T. Olcott, Rochester N. Y.
Mr. and Mrs. C. A. Reed, Washington, D. C.
Irwin R. Waite, Stamford, Ct.
Prof. W. O. Filley, State Forester, Connecticut.
Prof. Record, State College of Forestry.
A. C. Pomeroy, Lockport, N. Y.
S. M. McMurran, Washington, D. C.
Harry R. Weber, Cincinnati, Ohio.
Fitch A. Hoyt, Stamford, Conn.
Wm. H. Bump, Stamford, Ct.
Wilber F. Stocking, Stratford, Ct.
J. A. Seitz, Greenwich, Ct.
L. C. Root, Stamford, Ct.
John Rick, Redding, Pa.
F. A. Bartlett, Stamford, Ct.
J. F. Jones, Lancaster, Pa.
R. H. G. Cunningham, Stamford, Ct.
Col. C. A. Van Duzee, Cairo, Ga.
John H. Hohener, Rochester, N. Y.
C. L. Cleaver, Hingham, Mass.
Fred A. Smith, Hathorne, Mass.
Dr. Lewis H. Taylor, Washington, D. C.
W. H. Druckemiller, Sunbury, Pa.
W. G. Bixby, Brooklyn, N. Y.
Mr. and Mrs. C. S. Ridgway, Lumberton, N. J.
Miss Marie Brial, Stamford, Ct.
J. E. Brown, Elmer, N. J.
A. M. Heritage, Elmer, N. J.
Dr. R. T. Morris, N. Y. City.
T. P. Littlepage, Washington, D. C.
Gray Staunton, Stamford, Ct.
J. L. Glover, Shelton, Ct.
Dr. E. F. Bigelow, Stamford, Ct.
Prof. W. N. Hutt, Raleigh, N. C.
Mr. and Mrs. H. L. Lewis, Stratford, Ct.
H. W. Collingwood, New York City.
Dr. J. H. Kellogg, Battle Creek, Mich.
Dr. and Mrs. W. C. Deming, Georgetown, Ct.
Mr. and Mrs. M. A. Mikkelsen, Georgetown, Ct.
Paul M. Barrows, Stamford, Ct.
G. W. Donning, North Stamford.
Mrs. Payson Irwin, Stamford, Ct.
Noble P. Randel, Stamford, Ct.

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NORTHERN NUT GROWERS ASSOCIATION

REPORT

OF THE PROCEEDINGS AT THE

NINTH ANNUAL MEETING

ALBANY, GEORGIA

OCTOBER 30, 31, NOVEMBER 1, 1918

NORTHERN NUT GROWERS ASSOCIATION

REPORT

OF THE PROCEEDINGS AT THE

NINTH ANNUAL MEETING

ALBANY, GEORGIA

OCTOBER 30, 31, NOVEMBER 1, 1918

This was planned to be a joint meeting with the National Nut Growers Association. Owing to the prevalence of an epidemic of infantile paralysis at the time, however, this meeting was not held.

NORTHERN NUT GROWERS ASSOCIATION

REPORT

OF THE PROCEEDINGS AT THE

TENTH ANNUAL MEETING

BATTLE CREEK, MICHIGAN

DECEMBER 9 AND 10, 1919

NORTHERN NUT GROWERS ASSOCIATION

REPORT

OF THE PROCEEDINGS AT THE

TENTH ANNUAL MEETING

BATTLE CREEK, MICHIGAN

DECEMBER 9 AND 10, 1919

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President	W. S. Linton	Saginaw, Michigan
Vice-President	James S. McGlennon	Rochester, New York
Secretary and Treasurer	Willard G. Bixby	Baldwin, Nassau Co., New York
Acting Secretary	W. C. Deming	Wilton, Connecticut

COMMITTEES

Auditing—C. P. Close, C. A. Reed

Executive—J. Russell Smith, W. C. Reed and the Officers

Federal Aid—J. M. Patterson, R. T. Morris, J. H. Kellogg, T. P. Littlepage, Willard G. Bixby, J. F. Jones, J. S. McGlennon

Finance—T. P. Littlepage, Willard G. Bixby, W. C. Deming

Hybrids—R. T. Morris, C. P. Close, W. C. Deming, J. G. Rush

Membership—Harry R. Weber, R. T. Olcott, F. N. Fagan, W. O. Potter, W. C. Deming, J. Russell Smith

Nomenclature—C. A. Reed, R. T. Morris, J. F. Jones

Press and Publication—Ralph T. Olcott, J. Russell Smith, W. C. Deming

Programme—W. C. Deming, J. Russell Smith, C. A. Reed, R. T. Morris

Promising Seedlings—C. A. Reed, J. F. Jones

STATE VICE-PRESIDENTS

California	T. C. Tucker	311 California St., San Francisco
Canada	G. H. Corsan	17 Rusholme Park Crescent, Toronto
Connecticut	Henry Leroy Lewis	Stratford
Georgia	J. B. Wight	Cairo
Illinois	E. A. Riehl	Godfrey
Indiana	M. P. Reed	Vincennes
Maryland	C. P. Close	College Park
Massachusetts	James H. Bowditch	903 Tremont Building, Boston
Michigan	Dr. J. H. Kellogg	Battle Creek
Missouri	P. C. Stark	Louisiana
New Jersey	C. S. Ridgway	Lumberton
New York	M. E. Wile	37 Calumet St., Rochester
Ohio	Harry R. Weber	601 Gerke Building, Cincinnati
Pennsylvania	J. G. Rush	West Willow
Texas	R. S. Trumbull	M. S. R. R. Co., El Paso
West Virginia	B. F. Hartzell	Shepherdstown

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Tucker, T. C., Manager California Almond Growers Exchange, 311 California St., San Francisco

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Sager, Dr. D. S., Brantford

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Bartlett, Francis A., Stamford
Deming, Dr. W. C., Wilton
Filley, W. O., State Forester, Drawer 1, New Haven
Glover, James L., Shelton, R. F. D. 7
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Ives, Ernest M., Sterling Orchards, Meriden
Lewis, Henry Leroy, Stratford
McGlashan, Archibald, Kent
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Pomeroy, Eleazer, 120 Bloomfield Ave., Windsor
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Southworth, George E., Milford, Box 172
Staunton, Gray, 98 Park St., New Haven
White, Gerrard, North Granby

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*Littlepage, T. P., Union Trust Building, Washington
Reed, C. A., Nut Culturist, Department of Agriculture, Washington
Taylor, Dr. Lewis H., The Cecil, Washington
†Van Fleet, Walter, U. S. Department of Agriculture, Washington

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Spence, Howard, Eskdale, Knutsford, Cheshire

GEORGIA
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Wight, J. B., Cairo

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Librarian, University of Illinois, Urbana
Poll, Carl J., 1009 Maple St., Danville
Potter, Hon. W. O., Marion
Riehl, E. A., Godfrey, Route 2
Uran, B. F., Mattoon

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*Life member.
†Honorary member.

INDIANA

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Reed, M. P., Vincennes
Reed, W. C., Vincennes
Simpson, H. D., Vincennes
Staderman, A. L., 120 S. Seventh St., Terre Haute
Wilkinson, J. F., Rockport

IOWA

Snyder, D. C., Center Point (Linn Co. Nurseries)

KANSAS

Sharpe, James, Council Grove, (Morris Co. Nurseries)

KENTUCKY

Baker, Sam C., Beaver Dam, R. D. 2
Livengood, Frank M., Berea

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Keenan, Dr. John F., Brentwood
Littlepage, Miss Louise, Bowie

MASSACHUSETTS

*Bowditch, James H., 903 Tremont Building, Boston
Cleaver, C. Leroy, 496 Commonwealth Ave., Boston

MICHIGAN

House, George W., Ford Building, Detroit
Kellogg, Dr. J. H., 202 Manchester St., Battle Creek
Linton, W. S., President Board of Trade Saginaw
McKale, H. B., Lansing, Route 6
Schram, Mrs. O. E., Galesburg, Box 662

MISSOURI

Mosnat, H. R., 3883 East 62 St., Kansas City
Stark, P. C., Louisiana
Ward, Miss Daisy, 2019 Allen Ave., St. Louis

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Caha, Wm., Wahoo

NEVADA

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Landmann, Miss M. V., Cranbury, R. D. 2
Marston, Edwin S., Florham Park, Box 72
Price, John R., 36 Ridgedale Ave., Madison
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Crane, Alfred J., Monroe, Box 342
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Goeltz, Mrs. M. H., 2524 Creston Ave., New York City
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Hodgson, Casper W., World Book Co., Yonkers
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McGlennon, James S., 528 Cutler Building, Rochester
Olcott, Ralph T., Editor American Nut Journal, Ellwanger and Barry Building, Rochester
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Ketchum, C. S., Middlefield
Truman, G. G., Perrysville, Box 167
Weber, Harry R., 123 East 6th St., Cincinnati
Yunck, E. G., 706 Central Ave., Sandusky

Oregon

Pearcy, Knight, Salem, R. F. D. 3, Box 187

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Fagan, Prof. F. N., Department of Horticulture, State College
Heffner, H., Highland Chestnut Grove, Leeper
Hile, Anthony, Curwensville National Bank, Curwensville
Jenkins, Charles Francis, Farm Journal, Philadelphia
*Jones, J. F., Lancaster, Box 527
Kaufman, M. M., Clarion
Leas, F. C., Merion Station
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Weaver, William S., McCungie
Wilhelm, Dr. Edward A., Clarion
*Wister, John C., Wister St. & Clarkson Ave., Germantown

South Carolina

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Texas

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Trumbull, R. S., Agricultural Agent, El Paso & S. W. System Morenc
Southern R. R. Co., El Paso

Virginia

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Smith, Dr. J. Russell, Roundhill

West Virginia

Brooks, Fred E., French Creek
Cannaday, Dr. John Egerton, Charleston, Box 693
Hartzell, B. F., Shepherdstown
Jenkins, Miss, The Green Bottom Homestead, Glenwood P. O.

---

*Life member.

CONSTITUTION

ARTICLE I

Name. This society shall be known as the NORTHERN NUT GROWERS ASSOCIATION.

ARTICLE II

Object. Its object shall be the promotion of interest in nut-bearing plants, their products and their culture.

ARTICLE III

Membership. Membership in the society shall be open to all persons who desire to further nut culture, without reference to place of residence or nationality, subject to the rules and regulations of the committee on membership.

ARTICLE IV

Officers. There shall be a president, a vice-president and a secretary-treasurer, who shall be elected by ballot at the annual meeting; and an executive committee of five persons, of which the president, two last retiring presidents, vice-president and secretary-treasurer shall be members. There shall be a state vice-president from each state, dependency, or country represented in the membership of the association, who shall be appointed by the president.

ARTICLE V

Election of Officers. A committee of five members shall be elected at the annual meeting for the purpose of nominating officers for the following year.

ARTICLE VI

Meetings.—The place and time of the annual meeting shall be selected by the membership in session or, in the event of no selection being made at this time, the executive committee shall choose the place and time for the holding of the annual convention. Such other meetings as may seem desirable may be called by the president and executive committee.

ARTICLE VII

Quorum. Ten members of the association shall constitute a quorum, but must include a majority of the executive committee or two of the three elected officers.

ARTICLE VIII

Amendments. This constitution may be amended by a two-thirds vote of the members present at any annual meeting, notice of such amendment having been read at the previous annual meeting, or a copy of the proposed amendment having been mailed by any member to each member thirty days before the date of the annual meeting.

BY-LAWS

ARTICLE I

Committees. The association shall appoint standing committees as follows: On membership, on finance, on programme, on press and publication, on nomenclature, on promising seedlings, on hybrids, and an auditing committee. The committee on membership may make recommendations to the association as to the discipline or expulsion of any member.

ARTICLE II

Fees. The fees shall be of two kinds, annual and life. The former shall be two dollars, the latter twenty dollars.

ARTICLE III

Membership. All annual memberships shall begin with the first day of the calendar quarter following the date of joining the association.

ARTICLE IV

Amendments. By-laws may be amended by a two-thirds vote of members present at any annual meeting.

Northern Nut Growers Association

TENTH ANNUAL MEETING

December 9 and 10, 1919

Battle Creek, Michigan

The tenth annual meeting of the Northern Nut Growers' Association was called to order at 11:00 A. M., Tuesday, December 9, 1919, in the Annex Parlor of the Battle Creek Sanitarium, Battle Creek, Michigan, with the President, W. C. Reed, presiding.

The meeting was opened with a short business session beginning with the President's report as follows:

PRESIDENT'S ADDRESS

W. C. Reed, Vincennes, Ind.

Fellow Members, Northern Nut Growers Association,
Ladies and Gentlemen:

Our Association meets today under the most favorable surroundings. We have this splendid building in which to hold our meetings, furnished gratuitously, also have with us in this wonderful Institution several thousand guests, men and women of ability and prominence in their respective communities, from all parts of the United States.

Dr. Kellogg has been very kind and generous in extending an invitation several times to this association, and your speaker has thought there was no place quite so well suited for a winter meeting. It gives me great pleasure to be able to be with you and preside over a meeting as the guests of Dr. Kellogg. There is probably no man in America who has done so much to further the use of nuts, to show their benefits, and to explain their uses, as a food for mankind.

Conditions have changed greatly since our last meeting, September 1917, at Stamford, Connecticut. At that time the greater part of the world was at war, and owing to conditions prevailing during 1918, it was impossible for this association to hold its annual meeting. Your speaker is still holding the office of President because you have had no meeting at which new officers could be elected. It is to be regretted that the past three years have been crowded so full of events, that it was impossible to give the association matters the attention they deserved, and devote the time to them I would have liked to have done.

With the armistice came a cessation of war, and we are all happy that the terrible struggle is over, but with it have come conditions that are almost as terrible as war. Famine and want stare millions of people in the face on the continent of Europe. Our own country is at present in the grip of strikes for higher wages, the like of which has never been known. Yet we are prosperous beyond the greatest dreams of any nation on earth, but with this prosperity comes many duties. Our yields of food crops have been great, but to us has fallen the lot of feeding the world, and this will continue until industrial and agricultural conditions of Europe, have been reestablished on a pre-war condition.

There never was a time when meats of all kinds were so expensive, and to many almost prohibitive. Many have learned the use of nut meats in varied ways until all kinds of edible nuts are quoted on the markets today at prices undreamed of in former years. These conditions will not always last; crop failures will come; and production will be curtailed. Land values are advancing so rapidly that the production of cheap meats will be impossible. To help supply this deficiency, there will be an increased demand for nuts of all kinds.

To help meet this demand, much can be done by road side planting. On our main market highways, such trees as the grafted black walnuts could be planted profitably, in many sections of the country; the English walnut in some parts where they succeed the best; and the pecan and chestnut in other parts of the country where they are specially adapted.

While commercial planting of nut trees may not be attractive to the average man, home planting of a few nut trees can be recommended for every where space is available. They will make beautiful shade trees, and produce crops that will eventually be of great value. To land owners who are planting private parks, avenues and pastures, we would recommend nut trees.

The production of nut trees is very difficult, and the development and testing of new varieties, a slow and expensive process. We need the Government's helping hand, and are very glad that there has been set aside by Congress an appropriation to help develop this industry. We have with us, the Nut Culturist from the Department of Agriculture, who is devoting his entire time along these lines.

On the programme that is to be presented here, today and tomorrow, are men of national reputation in their respective lines, who stand at the head of their profession. To our friends and visitors here, we extend an urgent invitation, that you attend all the meetings possible, and we trust that you may learn much that will be of interest.

and that this information may be taken home to your different communities.

Our sincere thanks should be extended to the Programme Committee and our very efficient Secretary who have given so much time to this work.

For an association to stand still, is usually to go backward. Owing to war conditions, and missing one meeting, we have had little chance to increase our membership. I sincerely trust that the Membership Committee will be active while here, and extend an invitation to all to become members, and to help advance an industry that will be for the good of posterity, and should give us much pleasure during our own lifetime.

We are told, the good we do unto others lives after us. May the Nut Trees planted and fostered by the members of this association, live long to wave their leafy branches under Heaven's purple dome, and may weary pilgrims of future generations rest beneath their shade, and enjoy their fruits, thanking us with a silent prayer that these trees were planted for their benefit.

PRESIDENT REED: I believe the next thing in order will be the reading of the secretary's and treasurer's reports. Does any one have anything to present while we are waiting for the secretary, who is busy?

DR. MORRIS: How many members have we, Mr. President?

PRESIDENT REED: I don't know. Several have written me asking about members, and Mr. Olcott probably knows something about it.

MR. OLCOTT: I don't know how many there are now; but I think there were 150 or 200 at the time of the Stamford meeting. I think there were that many enrolled. I presume that two-thirds of those renewed—probably something over 100 members.

PRESIDENT REED: There were 138 paid members.

DR. MORRIS: Dr. Kellogg says there may be a thousand men in the audience this evening, and if there are we ought to do some propaganda work.

PRESIDENT REED: I don't remember who the membership committee was. Mr. Weber was chairman, I believe, and he is not here. Olcott is next on the committee.

MR. OLCOTT: I didn't know I was on that committee.

PRESIDENT REED: Fagan was on that committee. Potter, Deming, Williams, J. Russell Smith. I guess you are the only member of the committee who is here. We are ready for the report of the secretary and treasurer, Mr. Bixby.

REPORT OF THE SECRETARY-TREASURER

Sept. 1, 1917-Nov. 30, 1919

RECEIPTS

	Sep.1,'17 to Dec.31,'17	Jan.1,'18 to May20,'18	May21,'18 to Dec.31,'18	Jan.1,'19 to Nov.30,'19	Total	Balance
Balance on hand date of last report, August 31, 1917...						$ 15.93
Received from annual members including joint subscriptions to American Nut Journal ....$	69.50	$123.54	$ 73.75	$247.35	$514.14	
Received in payment of life membership	20.00			25.00	45.00	
Sale of reports, brochures and leaflets	2.25	4.00	9.95	4.85	21.05	
Advertising in report of Stamford meetings 8th, 1917...	21.00				21.00	
Sales of sundry material...		1.58			1.58	
Contributions for 1917 Contest		16.00			16.00	
Contributions for 1918 Contest			25.00	125.00	150.00	
Contribution for special hickory prizes				25.00	25.00	
	$112.75	$145.12	$108.70	$427.20	$793.77	$793.77
EXPENDITURES						$809.70
American Nut Journal, their portion of joint subscriptions ....$	6.75		$ 14.00	$ 59.00	$ 79.75	
Stationary, printing and Supplies	.69		44.05	49.50	94.24	
Postage, Express, etc........	4.82	13.95	9.66	9.24	37.67	
Prizes 1917 Nut Contest.....			15.00		15.00	
Prize 1918 Nut Contest				107.00	107.00	
Advertising 1917 Nut Contest $10.21; expenses 1917 contest $2.90..................		13.11			13.11	
Advertising 1918 Nut Contest				51.50	51.50	
Stamford Meeting 1917 expenses	65.55				65.55	
Printing Report of Stamford Meeting			162.00		162.00	
Errors in remittance corrected		3.85		3.50	7.35	
Litchfield Savings Bank. Life membership of John Rick.	20.00				20.00	
	$97.81	$ 30.91	$244.71	$279.74	$653.17	
						$653.17
Balance on hand Dec. 1, 1919.						
Special hickory prize.....						25.00
Life membership Lee W. Jaques						25.00
For regular expenses.....						106.53
						$809.70

I have carefully been over the above statement and found it to be correct.

C. A. REED, for Auditing Committee.

The above are records of receipts and expenditures for two years and three months and are approximately double those noted in the report of of the Stamford meeting. The activities of the Association were necessarily at a low ebb in war time, and, although a joint meeting with the National Association was planned for the fall of 1918, it was never held.

The list of members printed in this report numbers 128 while that in the last one shows 166, apparently a very large decrease. The last report showed 138 paid up members. Following the methods of Secretary Deming, members who have not responded to notices and letters have been dropped. In no case has a member been dropped until a letter with return postage has been sent. In a number of instances members thus written to have resigned giving various reasons, the most common of which are change of occupation or residence, which prevented their doing anthing in the line of nut growing or lack of success in their attempts to grow nuts. Two members have died since the last meeting, Mr. Wendell P. Williams and Mr. Mahlon Hutchinson; the former was in the U. S. Service at the time of his death. 57 new members have been added to our rolls since 1917 making a total of 410 joining since organization of whom we now have 128, 282 having dropped out. Of the 52 who have joined since last meeting, 21 joined before Oct. 1, 1919 the date of the proposed meeting in Albany, Ga., which was never held, and 31 since that date.

The holding of members is a difficult problem and one that has not been worked out at all satisfactorily. Most members join in the hope of thereby learning how to successfully grow nut trees. They find out that so much is still exerimental that most do not remain. This is bound to continue till we can show grafted or budded nut trees bearing satisfactory crops, and, until that time, there seems nothing to do but too keep on going after new members and by means of bulletins, reports, letters and otherwise making the membership more valuable than ever. There has been a greater interest in nut growing during the past fall than at any time since your Secretary-Treasurer has held office.

Respectfully submitted,
WILLARD G. BIXBY,
Secretary-Treasurer.

President Reed: You have heard the report. What is your pleasure? I believe that is usually referred to an auditing committee. C. A. Reed was chairman of that committee.

Mr. Bixby: Mr. Reed spoke to me about this yesterday. He said he would be glad to audit it, but there has not been time to give it to him. It was ready for him this morning, but he was busy on other things.

President Reed: What is the next thing on the program, Mr. Secretary?

Mr. Bixby: The reports of committees. I do not know how much report the standing committees have.

President Reed: There is the executive committee, the finance committee, the hybrids committee—maybe Dr. Morris has something on that.

Dr. Morris: No, I have no report to make on that. I shall talk on the subject this afternoon or in the course of my paper incidentally. I didn't see any occasion for action in that direction since the last meeting, so I have not acted except incidentally in the course of my work.

President Reed: The committee on nomenclature—of course they wouldn't have any report until after this meeting.

Mr. Bixby: Who is on that committee?—C. A. Reed, Dr. Morris, and J. F. Jones. Two members of the committee are here. There is one matter which perhaps I better bring up to the committee first,—one matter I think they should take some action on.

President Reed: I think it would be best to have that come up at a later time.

Dr. Morris: I would like to bring in something incidentally in relation to nomenclature in my paper. Perhaps we could have the question discussed after I have brought up that point.

President Reed: There is a committee on promising seedlings C. A. Reed, and J. F. Jones. I think that covers all the standing committees. Wasn't there a committee on nominations for officers to be elected, this morning?

Mr. Bixby: That nominating committee has to be elected.

President Reed: How many members?

Mr. Bixby: There were four or five last time, I think.

President Reed: (Reading by-laws calling for five members).

Mr. Bixby: I move Mr. Olcott be on the committee.

Voice: I second the motion.

President Reed: It has been moved and seconded that Mr. Olcott be elected as a member of the nominating committee. All in favor say, Aye. It is so ordered. Who else shall we have, for a second member?

Mr. Linton: I move Mr. Bixby be a member of the committee.

Mr. Bixby: There is a precedent that the secretary has never been a member of the nominating committee. He has sometimes given them information. I move Dr. Morris, Mr. Jones, and Mr. Linton be members of the nominating committee, and Mr. McGlennon.

Mr. McGlennon: I second the motion.

Mr. Olcott: The committee as you suggested it is Dr. Morris, Mr. J. F. Jones, Mr. Linton, Mr. McGlennon and myself?

President Reed: You have heard the motion. All in favor say Aye. The committee stands elected as named. They report at tomorrow morning's meeting. I think there is one matter it would be well to bring up, and that is the membership committee.

Mr. Olcott: I was going to suggest that is an important matter, and I think that committee should be filled out with those who are present, inasmuch as the regular members are not here. It looks as though a comparatively small membership would have to double up on membership committee.

President Reed: Have you any suggestions as to whom you want on that committee?

Mr. Bixby: Those committees, with the exception of the nominating committee, are appointed by the president. I think myself that the new president appoints them.

President Reed: My idea was to appoint for this meeting and help Mr. Olcott out.

Mr. Olcott: I suggest Mr. McGlennon and Mr. Jones as two of the members.

President Reed: Let it stand as it is with the three and give the chairman power to appoint two more later.

Mr. McGlennon: Can the secretary tell us how many members there are?

Mr. Bixby: One hundred sixty-four notices of this meeting were sent out. There are 128 paid up members.

Mr. Olcott: On the matter of membership, I wonder if the association could suggest some inducement for membership, or summarize the inducements. As you know, the American Association of Nurserymen has been desirous of more members, and they found it very advisable to outline definitely the benefits of membership in that association. I am wondering if that has been done recently and could not be emphasized in some way to the advantage of larger membership. You have got to do something more than say that there is in existence an association devoted to these purposes, and everybody is invited to come in. Maybe the secretary has something on that line.

Mr. Bixby: I have no suggestion. It is very evident that there is a greatly increased interest in nut growing over what there was when I first took up the office. That is very clearly brought out by the amount of mail received. You may know that Capt. Deming, when in the service, took the position of editing the nut department of the American Fruit Grower. I saw him recently and it looks to me as if, as editor of that department, he is answering about as many correspondents on nuts and trying to boost the association in that way as he did when he was secretary before. And that would appear to be in addition to the communications that are coming to me now.

Mr. Olcott: There is interest. We get at the Journal office a great quantity of inquiries but only a small per cent of them result in memberships and subscriptions, and while this interest is so strong, ought not this association to study that which is something of a problem— perhaps something that ought to be taken up in view of the interests and the benefits of the association shown.

President Reed: I think that is a good suggestion. I think they need something along that line. Is there anything else we want to bring up at this morning session?

Mr. McGlennon: Is this not a very good field to open up operations along that line, right here at Battle Creek? A large number of people who come here are people who eat nuts, and I believe that condition would resolve itself into a material advance of membership. I think we ought to get busy right here and see if we can not enlist the membership of a great number of the patrons of this institution.

Mr. Olcott: That was the principal object of the membership committee I suppose. My idea was to get the ideas of the individual members, put them together and present a broadside of benefits in this organization rather than have one man attempt to outline them.

Dr. Morris: There is an immense amount of interest. The question is how to get it together and formulate it in such a way that men will join. There is an enormous, large loose majority, and we must have a small compact minority to swing it as the Senators do down at Washington, you know. Prof. Murrill of the New York Botanical Garden told me that wherever he went (he is interested in mushrooms, that is his special subject) he had had no idea in the world there was so much interest of the public in mushrooms; yet when it comes to getting together members to form the base of an association to study the subject, he finds very few members. It is simply because men haven't got the habit, and we have got in some way to give direction to that in such a way that it will be focussed and concentrated on some one objective point. How to do it, I don't know.

Mr. Bixby: Dr. Kellogg suggested that at the meeting this evening there will be the largest number of people, not members, that there has been at any meeting; and he said he had had requests from people that they wanted to hear Dr. Morris, and they wanted to hear Prof. Cajori who used to be here, and he asked me to change those from this afternoon to this evening in order to accomplish that, and I said we would switch the program. That was for that very purpose.

Mr. Olcott: Mr. President, it just occurred to me that in view of the number of inquiries we get, and I am sure the secretary gets, and I am also sure Dr. Deming gets from his articles, there is no doubt of the interest, yet the joining of this Northern Association, and the attendance of its single annual meeting, does not appeal to many. They do not find it convenient to attend the convention; they do not see any great amount of benefit in the membership. It occurs to me that if we had a list of state vice-presidents and each of those could provide for some local gathering of people interested in nut culture in the various communities; rather, I would say that if our members, as fast as we can increase our membership, wherever they are located, would form a nucleus of a little circle in their neighborhood, and have them affiliated with the Northern Association; it would accomplish this result. And afterward it occurred to me that perhaps that could be done through state vice-presidents. But what is really needed is to get them together in meetings. They won't come yet. They will when you get a larger membership, but they won't come to the annual meeting of this association where I think they would go to a community affair and talk over matters and refer difficult problems to the Northern Association of which they were affiliated members. In some way, a wheel within a wheel could work at it that way, and we could increase membership in that way.

Dr Morris: It is a rule in psychology that you have got to have personal interest first. If Mr. Olcott's idea of having a local vice-president offer prizes, no matter how small, for nuts in the vicinity, and would also state that any one finding some remarkable nut would have that nut named after him to go down to all time, you would have two points there in self-interest. First, a five dollar prize to the best nut; next the name going rattling down through time in association with it. There are two points of personal interest. We may as well take it back to the basic principles and begin with the psychology of the situation.

Mr. Ketchum: Mr. President, in regard to these vice-presidents, that point looks to me very good for this reason. I saw it work out in the Minnesota State Horticultural Society. They had a vice-president in each congressional district. I was vice-president in the third district one year myself. From them reports were sent from their district by people who were interested. They were asked to fill out blanks about conditions as they found them in their neighborhood and we got great good from it. Then this vice-president was to make a general district report from the reports sent him, and hand it in at the annual meeting. It was quite a success.

Dr. Morris: There you have civic pride brought into your psychology.

Mr. Ketchum: That was in the third district which included the northeast part of the state. It was quite a large district geographically, and I sent out something like seventy of these blank reports, and while the interest was very slight, I think I got 23 field reports in return, and out of those 23 were some nine or ten that were of some considerable importance; but it was a great big help to me in making out my report together with what I knew in my own location. The percentage of reports that came back showed that there was great interest taken by those persons.

Dr. Morris: You can arouse local pride in any locality.

President Reed: I have tried that in our own state in the last two or three years, at county fairs and local district horticultural meetings. Several times I have offered prizes out of my own pocket individually; then I have gotten other parties to help in some cases, and some exhibits even at county farmers' institutes, even very creditable exhibits and they seemed to attract as much interest even as the school exhibits. I know of one case at Martinsville two years ago this winter where the nut exhibit was almost as large as the fruit exhibit, and I think it attracted more attention; and I think there was only something like ten dollars spent in order to get it out. I think that work along that line, missionary work of that kind, is going to do us more good than almost any other endeavor.

Mr. Olcott: I do not think that the industry is old enough or strong enough yet, perhaps, to operate that state vice-president plan as it would be perhaps later on, for this reason, that if you have a state vice-president, you narrow the activity in that state to that immediate locality. But it would probably be much better, instead of that, to endeavor to get each member to form the nucleus of a local circle, and so have ten or a dozen in a state instead of one.

President Reed: I think that suggestion is better.

Mr. Olcott: That was my original idea, and the state vice-president idea came in afterwards.

Mr. McGlennon: How many states are included in the northern association territory?

Mr. Bixby: There is no limit.

Dr. Morris: Northern is a relative term.

President Reed: I don't think there is any clearly defined line where the Northern Association is.

Mr. Olcott: For the reason that men live in the North are interested in lands in the South, and *vice versa.*

President Reed: There are twenty-three vice-presidents on the list here, in the last published report. Is there anything else that should come up at the morning session? Mr. Secretary, do you know of anything else?

Mr. Bixby: I would really like to see something definite on this line of increasing the membership. I can think of several things that will help; but to get something that is going to have action right away is not so clear. Recently I have had a good many people come down to my place to look at the small orchard I have there. I aim to have varieties of every nut tree that is being propagated, and I think if I keep at it a few years longer I will pretty nearly have them; and in most cases, when people have come down that way, they have become members afterwards. Two or three of them have. I am only twenty miles from New York City, and it is not difficult, if I find someone interested, to invite them down to look over the trees growing there, and usually when they come they join afterwards.

Mr. Olcott: Pardon me for speaking again, but I am on the membership committee and I am anxious to draw out anything that may be of use. Why could not some plan be devised by the secretary or by this committee and sent out tentatively in the way of suggestion and perhaps some other suggestions will be made to add to it. Perhaps also in addition to this local community plan that I suggested, there might be formed, all of it within the Northern Association, a subsidiary thereto—the walnut society—people particularly interested in the walnut, but do not care for the hickory, pecan or any other nut. You will find people particularly interested in the black walnut, some in the Persian walnut, some in the filbert--form a filbert society as the American Nut Journal has suggested, and let all the enthusiasts of the filbert get together, and if they are scattered, let them keep together by correspondence and increased activity in that way. The same for the butternut. Get at it from that way.

Mr. Ketchum: Another thing to further our society here today, we can make those small organizations auxiliary thereto.

Dr. Morris: Any one who is interested in one nut becomes interested in all eventually.

Mr. Bixby: I received more inquiries regarding the Persian walnut and the pecan than any other nuts probably more regarding the Persian walnut. Nearly everybody who writes wants to grow Persian walnuts; and in the great majority of instances, I have to try to switch them onto black walnuts with the suggestion that they plant a few Persian walnuts because we have no experimental data of the Persian walnut succeeding in their section. In some instances they will turn to the black walnuts; in other instances I hear nothing further from them. The Persian walnut is the most popular with people who have not tried to grow any nuts. Mr. Jones perhaps can tell us how his inquiries run. Don't they run very largely for Persian walnuts?

Mr. Jones: Yes, they do. I was thinking possibly you could make a combination—take, for instance, the membership, the nut journal, and some nut trees. The nurserymen could make considerable concession.

Dr. Morris: That combination is right well.

Mr. Jones: You could give a coupon good for so much on an order for trees or something of that sort.

Mr. Bixby: That suggestion was made and I referred it to the executive committee. I have not had any reply.

President Reed: I didn't have time to answer the communication and get it back to you before I came here; so I thought we would decide on that here. If there is nothing further to come up this morning, a motion to adjourn will be in order until the afternoon sesssion.

Mr. Bixby: I might repeat that at the request of Dr. Kellogg, in order to get the papers which he had been particularly requested to have given so that people could hear them, Dr. Morris and Prof. Cajori who were scheduled this afternoon, will come this evening, and Mr. Hoover's and Mr. Graves' papers, which were scheduled for this evening, will have to come this afternoon. Neither of the writers are present, but the papers are here. Mr. Graves expected to be here but I had a telegram yesterday that he could not get away. I have the paper, though and the photographs.

Mr. McGlennon: Has there been provision made for a paper on filberts by Mr. Vollertsen? If not, I should like to have it.

Mr. Bixby: Certainly, there can be. It ought to come in this afternoon. I wrote Mr. Vollertsen asking if he could deliver it.

Mr. McGlennon: He has the paper prepared, and I want to hear it. I have been closely associated with Mr. Vollertsen for some t[illegible] years, and I know that his whole heart and soul are in the development of the filbert; and I know what he has done and that he is a rare character in the nut world today, that he possesses a fund of information I am sure you will find intensely interesting; and furthermore I would suggest, and I believe I speak for him when I say I hope you will feel free to ask him questions. As I said before, he has a fund of information that I think we nut people ought to have, and the general public as well. We have a very good exhibit of the nuts. Mr. Vollertsen is the practical man in the enterprise we are interested in. I look after the business end of it. We are equally interested in it and feel that we have made some progress.

Dr. Morris: Put Mr. McGlennon on too.

Mr. McGlennon: I have said all I can say.

Mr. Vollertsen: You have said too much.

President Reed: If there is nothing else, we will stand adjourned until 2:30 p. m.

Tuesday Afternoon, December 9, 1919, 2:30 P. M.

President W. C. Reed, in the Chair

President Reed: The first paper is by Mr. Hoover. Matthew Henry Hoover, of Lockport, N. Y., president of the New York State Conservation Association. Mr. Hoover is not here, and the Secretary will read his paper.

THE FARMS BY THE SIDE OF THE ROAD

By Matthew Henry Hoover, Lockport, N. Y.
Formerly New York Conservation Commissioner
President New York State Conservation Association

Horace Greeley is best known for his contribution to the abolition of human slavery in the United States. Yet his service to mankind is not fully appraised by the average American, because many of the younger generation are unaware of his aid to agriculture. His maxim about farmers' failing to till the most valuable part of their farms underneath, opening the eyes of agriculturists to the efficacy of subsoil plowing, was the preamble to freeing American husbandry from the slavery of antiquated and unscientific methods.

Following the application of science to the cultivation of the soil, came the students of Conservation. They were teaching the farmer the relation of conservation of natural resources to agriculture, the effects of forests on rainfall, moisture, erosion of soil, minimization of floods that annually bury thousands of acres of arable lands in the valleys under rocky debris and so on.

Greeley discovered the Farm Below. The Conservationists are saving the Farm Above.

Now, in these days of reclamation and reconstruction, it is high time to pay more attention to the Farm by the Side of the Road.

The Northern Nut Growers' Association is to be congratulated upon the fact that it is blazing the trail through the forest of popular ignorance on this vitally important conservation question: leading public thought in the right direction: and providing both the seed and the stock for practical efforts in behalf of the Farm by the Side of the Road. I am going to claim a bond of brotherhood with you in this great work, basing my claim not upon my small activities in nut cultivation, but rather upon the fact that I was one of the conservation pioneers in New York State in the advocacy of planting profitable trees—nut trees and fruit trees—along the public highways.

That eminent conservationist, Gifford Pinchot, addressing the National Council of Farmers' Co-operative Associations in 1915, defined "Conservation" as "the wise use of the earth for the benefit of the people who live on it." That would be a perfect definition, if it did not invite the query: Should it not be enjoined upon the people who live upon the earth today, while enjoying its benefits, to keep faithful stewardship of the interests of the inhabitants of tomorrow?

About the time Mr. Pinchot enunciated this famous definition, the New York State Conservation Department summed up the purposes of practical Conservation as: "The correction of past indiscretion, the perfection of present utilization, and the formation of future accumulation with respect to natural resources."

Conservation activities must repair errors of the past which have left denuded forest lands and empty game covers and waters: they must afford and direct the present use of the forests and the streams: they must safeguard the future supply, if they would meet the requirements of a conservation which shall raise the standards of life and lower the cost of living. That is a conservation embracing both the aesthetic and the economic, the only kind worth while. It is a conservation wherein the arable areas and the so-called waste lands and waters have a very intimate interrelation of interests. And, I submit, Gentlemen, that the American people too long have failed to recognize and to account as in the class of waste lands, "The Farms by the Side of the Road."

The reclamation of waste lands is a compromise between the activities of the Conservationists, who claim that in the more thickly inhabited portions of the United States the cultivated or semi-cultivated areas are out of sane and safe proportion to the wild forest sections, and the advocates of intensive and extensive agriculture. It is not the purpose of this article to take sides in that controversy, but rather to invite attention of both sides to a safe and practical field for their endeavors, namely, the reclamation of the "wasted lands" along the roadsides, the farms along the highways.

During the War Garden campaigns of the past two years, these heretofore largely unused strips of tillable land, forming in the aggregate thousands of along-the-road acres in every state, received considerable attention from the thrifty plow and hoe. But in the main, the results were not encouraging. The public will trespass, unintentionally or otherwise, upon the land cropped along the highway. Then, if the farms by the side of the road are to be conserved—used by present as well as future generations—there remains but one practical recourse: productive trees.

The American people love beautiful trees, possibly the expression of a reaction from the sentiment of the pioneers who regarded trees as their enemies, handicaps to agriculture to be removed as thoroughly and expeditiously as possible. But with virgin soil producing enormous crops, they naturally centered their interest on ornamental trees without reference to their fruits. Hence the horse-chestnut, buckeye, maple, locust, oak, poplar, along the highways and byways of America, instead of the native nut trees and the Persian or English walnut.

And, speaking of highways, this is the age of concrete. Taking the hint, I am selecting one concrete example of which I have intimate and personal knowledge, well aware that there are numerous others that I might cite were my acquaintance with practical nut culture more extensive than it is. The one that I know about of my own personal knowledge is a very good example of the plain common sense of productive trees which combine the useful with the ornamental.

It Reads Like a Fairy Tale

In 1876 two Niagara County farmers, Norman Pomeroy and Matthew O'Connor, neighbors, decided to go to the Centennial. They packed one carpetbag in common for their baggage and boarded the train for Philadelphia. Although well to do farmers, their economic instincts warned them to beware the profiteering hotel keepers. So they sought a humble boarding house in the suburbs of the city. Returning one evening from sight-seeing at the exposition, the travelers were so weary that they retired immediately after supper. During the night Pomeroy was awakened by a tapping on the window. Assuring himself that the wallet under his pillow was still there, he investigated the cause of the disturbance of his slumbers. The noise had ceased and he decided that the overstrain of the day had worked an hallucination. Pomeroy dropped off to sleep, but presently was aroused by sounds which were unmistably caused by a gentle tapping on the window pane. Exasperated, the man arose, picked up a boot, slipped to the window and raised it gently ready to give the joker or would-be burgler a rousing whack on the head if within reach. He stuck his head out of the window for a better view of the exterior world, and his curiosity was rewarded with a stinging blow on the cheek. The pain aroused all the Pomeroy French Huguenot fighting blood in his veins. Viciously he swung the boot at the unseen foe, only to hear it crash through tree branches. Laughing softly, in his enlightenment, he reached out into the night, grasped a branch, broke it off and turned on the gas and lit it. On the twig were two curious nuts.

Pomeroy was a lover of nature, as I learned by many an interesting talk with him. He found time in his regular farming pursuits to study native trees and shrubs, and had forbidden his hired men to cut down any of the native nut trees on his 500 acre farm. But the nuts on the branch retrieved from darkness were specimens new to him and he could hardly wait for daylight to come to enable him to get acquainted with the tree which had invited his attention so rudely. Next morning Pomeroy learned that his new found arboreal friend was a Persian walnut. It was loaded and the wind storm of the night had covered the ground with shucked and unshucked nuts. By permission of the landlord, he gathered a peck of the Persian walnuts, wrapped O'Connor's and his own belongings in a newspaper and filled the carpet-bag with the nut treasures. Arriving home, the tourists stopped first at O'Connor's house. There they had to relate the experience of their great trip to an assemblage of the two families. The recounting of the Centennial wonders took until midnight. When Pomeroy picked up his carpet-bag to go home, it was empty! The children had made a discrete retirement after having consumed the entire peck of English walnuts, as the shells in the kitchen disclosed. Luckily for the youngsters, they were safe in bed and asleep.

The next day, according to the elder Pomeroy, little Albert who had not been at the O'Connor home the night before, heard the dolorous tale of the wonderful tree in Philadelphia, the gift of nuts and their weird disappearance. To confirm the sad story he picked up the carpet-bag, turned it inside out. Within a torn lining, he triumphantly extracted ten nuts. Child-like, he proceeded to sample them and had eaten three when his father rescued the remainder. Seven Philadelphia walnuts were planted in the yard, and, in due time there were seven slender, silver-grayish seedling trees. These were carefully staked, guarded and cultivated by Norman Pomeroy. Despite the caviling of the neighbors, who declared that a Persian walnut tree would not thrive and bear so far north, twelve years after planting the "lucky seven" reproduced their kind—from a dozen to two dozen large, handsome Persian or English walnuts. Today the seven Centennial trees are about two feet in diameter and about 60 feet high. And as to the value of the crop, one tree alone produced nuts which sold four years ago for $142.50.

Now as to the application of this romance in real life. I must return to the more prosaic generalizations of conservation and its relation to the products of cultivation with which this article began.

In 1913 Governor Martin H. Glynn invited me to outline for him a program of "Practical and Progressive Conservation", applicable to the needs of New York State. In the effort to meet the request, I drew a little from my personal experience and observations as a sportsman, a farmer and a newspaper man, and a great deal from what I had learned from others among the organized sportsmen, agricultural societies, hydro-electric engineers, forest products men, foresters, and nature lovers in general. We then set forth the following as necessary to the realization of the purposes of a Conservation which should meet all conditions imposed by the past, the present and the future, as hereinbefore stated:

"PRACTICAL AND PROGRESSIVE CONSERVATION"

1. Protect the birds and save the crops.

2. Develop the unutilized water powers, now going to waste with destructive effects in freshet periods to arable lands and thickly populated communities, through public ownership and distribution; thereby use "The People's White Coal," save coal and cussin' the ash-sifter, giving the public cheaper light and power for the homes, the farms, the factories, and public highways.

3. Amend the constitution to permit the use of dead and down timber in the state forest preserves, worth at least $10,000,000 annually.

4. Provide free forest trees furnished by the state for all who will plant them. (Note—The present N. Y. Conservation Commission in a special report to be made to the Legislature of 1920 has at last adopted that progressive policy).

5. Plant productive trees along the highways—nut and fruit trees.

6. Restock waters and covers more extensively and intelligently.

7. Stop pollution of private and public waters.

8. Harmonize the interrelated interests of farmers and sportsmen.

9. Establish game and bird refuges in every county in the state.

10. Sane and practical game laws, eliminating prosecutions on petty technicalities, educate the public to co-operate in fish and game protection, enact legislation to encourage rather than handicap the propagation of fish and game by private enterprise.

It will be noted that plank 5 in our progressive conservation platform is urging the planting of producing trees along the highways. By that we meant not only the native nut trees, all of which are beautiful and ornamental, but also fruit trees, according to the wishes of the abutting owners.

In the State of New York, taking into account only improved roads coming under the head of State or County Improved Highways, disregarding the mileage of the rural roads several times as large, there are about 8,000 miles of "Good Roads". There are many stretches of the highways which nature has generously adorned with trees. Some portions of the roads have witnessed the spoliation of the contractor's indiscriminating ax, but in the main the workmen were as careful as possible to retain natural shade trees along the routes. A few miles comparatively, were planted by state agencies. Farmers, especially in the Lake Ontario Fruit Belt of New York State, have worked wonders in ornamentation and economy by planting cherry, apple, plum and other beautiful and productive trees on the strip of land, "The Farms by the Side of the Road."

At a very small additional expense, the State could have planted every rod of improved highway with productive trees, putting that forethoughtful specification into the contracts.

Get out your pencil for a moment. Suppose the state had English walnuts on the 8,000 miles, placing the trees 40 feet apart. We should have growing then over one million productive trees and some of them would be old enough to be bearing today. Within ten years from now, their product would be worth at a conservative estimate $25 per tree, representing a sum sufficient to carry one-third of the State's entire cost of government.

The war just won for the cause of World Democracy has opened the eyes of the American people to many things they had not before apprehended or realized. One is the value of productive land space. Another is the importance of our forests, and especially the value of the native nut-bearing trees. It was discovered, when Uncle Sam scurried around to procure a supply of black walnut for gun stocks, that the German agents had been ahead of him. Although thickly settled, Germany finds it profitable to employ one-fourth of its entire area in growing forest trees. Yet it seems the Kaiser's forests were short on this valuable timber, so they picked up all the procurable black walnut in the United States.

This set the New York State Conservation Commissioner thinking and last year he advised farmers to propagate and cultivate the black walnut—a little late for the emergency; but better late than never, especially in this case.

On my little farm near Lockport, N. Y., there is a large black walnut tree, perhaps 90 to 100 years old. It bears a nut of unusual size, of excellent taste and good keeping qualities. This tree has produced as high as ten bushels of shucked nuts in a season. Twenty-two years ago, when the importance of growing native nut trees had impressed but few people, I did have the good sense to plant several dozen nuts from the "Niagara King Walnut." I must confess I gave the trees little attention, and a farm hand zealously cut down all but one of the black walnuts, mistaking them for sumac. The survivor last year bore about three bushels of nuts. Most interesting of all is the result of observations as to the product, and its bearing on the question of whether or not nut trees will reproduce "true to variety." The walnuts from the young tree differ in shape, being almost round, while the fruit of the parent tree is almost chestnut in form. But the flavor, thickness of shell and the keeping qualities seem identical.

Six years ago I started a small black walnut and butternut tree nursery for home use and from it have set out about four hundred trees along the ditches and fences on the farm. The early plantings have attained a height of from 12 to 15 feet. If every farmer would do likewise, he would make a considerable addition to the country's food supply, to say nothing of the value of the timber for coming generations when the trees approach maturity. It has afforded me pleasure to send nut trees to friends in various counties of the state and we shall watch with interest, the reports on their growth and development under the many variations of soil and climate. The butternut in many parts of the country is rapidly disappearing. To save this beautiful tree with its delicately flavored nuts, it will undoubtedly be necessary to take it into extensive cultivation.

Although apart from the subject perhaps, it may be interesting to refer to the application of forestry to a woodlot containing native nut trees. Like many farmers who regard every tree as just a tree, useful for timber or fire wood, I found several years ago that indiscriminate cutting on my woodlot was destroying walnuts along with the commoner species of the stand. My first step was to halt the cutting of all black walnuts, hickories, butternuts, oaks and beeches on the seven-acre woodlot. I took an inventory of these trees and found there were 160 shagbark hickories from 10 to 25 years old, five butternuts about 20 years old, and four black walnuts about 25 years old. These, of course, were not "tolerant trees" like the evergreens, and most of them were rapidly deteriorating from being overcrowded by more rapidly growing and less desirable neighbors. All of them had been retarded in growth by the crowded condition of the stand. Inaugurating a process of judicious thinning with a view to giving the nut trees the advantage, the result in a single season was surprising. Under the beneficient influence of ample sun, air and root sustenance, the butternuts and black walnuts bore fine crops for the first time, in the season following the winter thinning process. The young hickories contented themselves with making their first annual growth in years. And, Oh joy of realized hopes, in this the third season since letting the sun into the native nut grove, nearly all of the older shagbark hickories bore their first crops! And now I have a nut plantation, that might have been ere this, burned up as fire-wood, at no expense whatever, since the thinning out process produced a very welcome supply of fire wood in these days of high-priced coal.

In a recent bulletin of the United States Department of Agriculture, "Value to Farm Families of Food, Fuel and use of House," there are some illuminating statistics on "The Farmer's Income" and "The Farmer's Living." It is stated that "the total average of the three items of food, fuel and use of the house for the 950 families (selected from all parts of the United States) is $642, and 66% of $424 of this is furnished by the farm." The Seven Pomeroy Centennial Trees in one year produced a food product worth and actually sold for about $800 in one year! The average annual production of those seven trees has been over $600 for the last ten years. And what about the labor involved in raising and harvesting the English walnut crop in question? Picking the nuts from the ground, children gladly doing it and earning five cents per basket.

Horace Greeley's undiscovered farm under the first twelve inches was a gold mine when turned up finally; Mr. Pinchot's farm on top rescued from flood and other devastations is worth more money than before. But how about the strip of land along the roadside, an aggregate waste of at least one per cent of the acreages of eastern farms? Well worth reclaiming, and no expensive ditching, irrigation and lumbering involved in the process either. In addition, credit must be given also to this enterprise for the value of ornamentation of the highways and their protection from the elements all seasons of the year.

And strange to relate, in the long list of items under the head of "Classes of Food," given in the Federal Bulletin referred to, no mention is made of nut foods, either native or imported nut trees. Fruits, vegetables, meats, store groceries, everything is there but nuts.

"Nutty," do we hear someone suggest? Probably not in this audience of enlightened nut growers, but speaking to the general public we shall say, "Well, mebbe," like Uncle Lige of Niagara. Two bad years on the farm, four acres of tomatoes that didn't pay for the plants, nothing but soft corn and no potatoes compelled Uncle and Aunt Tompkins to open an account at the corner grocery. The first month the bill came in, Aunt Sally was all in a flutter when she audited the items: Sugar, 60; coffee, 40; oatmeal, 50; sugar, 75; ditto, 80. "Lige, you go right back to the store and tell that cunnin' clerk that he's charged us fer what we never got. We ain't had no 'ditto' in this house." Lige went to the store and returned, apparently a sadder but a wiser man. "Well, Lige, "inquired the thrifty spouse, "Did you find out 'bout that 'ditto' we didn't get? What did you find? Lige picked up his pipe, remarking, "Well Sally, I found I was a durned fool, and you *ditto.*"

We are all waking up to the fact that we did not become "nutty" soon enough. We have found that our public agencies of conservation have been "durn fools" and farmers and other land owners "ditto", for not having inaugurated the systematic planting of productive trees along the highways and farm hedgerows and ditches, many years ago.

Norman Pomeroy used to say with becoming modesty that he took no credit for planting the trees that have made such a substantial income for his family, because "I had to be slapped in the face in the dark before I became wise, and then the natural improvidence of mankind came near spoiling Nature's tip when the children gratified their little stomachs in preference to planting for the future. Men are but children of an older growth, a wise man said. That is a true but sad doctrine. We all live too much in the present and for the present, forgetting that the future will soon be the present, if not for ourselves, for our children and our children's children. It takes time to realize on trees, for the stomach or the pocketbook. It requires sacrifice to get anything worth while and, waiting is the hardest kind of sacrifice, especially for people of small means. But it pays in the end."

The Northern Nut Growers' Association, is doing valuable work not only in the study and planting of nut trees, but in its propaganda. But I have discovered that the results of practical work and the worth of propaganda are hard to bring home to public agencies, like Governors and Legislatures. The construction and maintenance of public highways are a state function. But that duty must be incomplete in our opinion until the state finishes its job by planting productive trees along the highways and public roads. How shall we bring this about? Adopt resolutions? Very good.

But did the Anti-Saloon League, for example, content itself with resolutions when it wanted real results in the halls of legislation? Not much. Our prohibition friends were very practical. They employed trained agents to present their cause everywhere and in every way calculated to do the most good.

Let me repeat to you tree planters the late Norman Pomeroy's favorite lines, as I recall them:

> *"The dead are eternized in stone,*
> *The living, by living shafts are known.*
> *Plant thou a tree and each recurring spring*
> *The stirring leaves thy lasting praise shall sing."*

PRESIDENT REED: Prof. Chittenden, of Michigan Agricultural College will address you on "Native Nut Tree Plantations for Michigan."

NATIVE NUT TREE PLANTATIONS IN MICHIGAN

Professor A. K. Chittenden, Michigan Agricultural College
East Lansing, Michigan

I am very glad of this opportunity to tell you what the Michigan Agricultural College is doing, and what it thinks, about nut tree plantations in this State. I want to say first, that there is a very general interest in nut trees among the farmers and land owners of the State. A considerable number of the letters that the Forestry Department of the College receives from farmers are about nut culture. They seem to be particularly interested in pecans, English walnuts, and chestnuts. A few years ago the State was flooded with literature urging people to plant these trees and we are still feeling the aftermath of this campaign. Much of this state is too far north for the successful growth of these particular trees and we therefore have advised waiting before investing heavily in young trees, until experiments have shown where they would succeed and what kinds it would be safe to plant. At the same time, we suggested the planting of one or two trees of certain varieties as an experiment. We have for the most part recommended only our native nut trees for planting on a large scale.

We have tried many varieties of nut trees, grafted on hardy stock, at the College, and only a few of them are alive today. All of the pecan trees have been lost and nearly all of the English walnuts. About two years ago, we got some of Burbank's Royal walnuts from California. All of these trees except one, were killed back of the graft the first winter. One of them, however, is doing well although growing very slowly. It will doubtless succeed now, as it has pulled through two winters, one an exceptionally cold one.

About three years ago, we bought some Sober Paragon chestnuts from an eastern nursery which had been advertising them widely in this State. They were all infected with the Chestnut Blight disease. Now this disease has at the present time not appeared in Michigan, except on imported nursery stock. We have a considerable number of chestnut plantations in the State, and if the disease can be kept out, there is no reason why chestnuts cannot be raised more profitably. But our experience has shown that the trees must be raised in this State and not brought in from outside. We have some very nice chestnut trees in our nursery at the College which are now thirteen years old and which have been bearing nuts for four years. This fall we are planting them all along the drives so as to open up the crowns and produce a greater production of nuts.

We also have some Japanese walnuts that are doing well indeed. One of these trees on the campus is 35 years old and produces a large quantity of nuts.

There are a number of English walnuts at various places along Lake Michigan in the fruit belt. Individual trees will often succeed. but the chances for success are not great enough to warrant a man putting very much money into a plantation. There are two Sober Paragon chestnuts near Niles which are now 12 years old and are growing and bearing well. At the College farm. near Grand Rapids. there are some pecan trees. but their history shows that they have been repeatedly frosted back.

I could mention a great many cases of success with individual imported trees. but I do not know of any extensive plantations that have so far succeeded.

There is. however. a different story to tell of our native nut trees of which there are many successful plantations. Our native edible nuts are black walnut. hickories and chestnut. They will grow anywhere in the southern part of the State and along Lake Michigan. Using these trees as a basis. I believe we can develop. if it has not already been done. a tree that will bear an improved quality of nuts and that will be perfectly hardy.

The black walnut is the tree that did perhaps more than any other tree to help win the war. and. while timber raising and nut culture do not perhaps go hand in hand, probably more black walnuts are being planted as individual trees than any other tree in the State. The black walnut was an invaluable tree for gun stocks and airplane propellers. The War Department scoured the country to find trees for these purposes and every black walnut that is now planted. may be of service to the country in the future. The College raises thousands of black walnuts and Japanese walnuts each year, and the demand for them is very great. When we have in planting. a choice between two trees. one choice being a tree suitable for shade only and the other a nut producing tree. I would say plant the nut tree. Our trees will have a double appeal if they furnish not only shade. but edible nuts as well. At the last session of the State Legislature. an act was passed providing for the planting of nut and shade trees along our highways. As a result of this act. we hope sometime to see the highways in the southern part of the State lined with walnut and other nut bearing trees. A tree that will serve a double purpose should be planted wherever possible.

Tree planting is a thing in which we are all interested. Those of you who have been abroad remember the long rows of trees, often fruit trees, that lined the roads. In this country we cannot plant fruit trees along our roads as there is nobody to care for them and disease would quickly start and spread to our orchards. But nut trees can be safely planted.

We have, on certain soils in the southern part of the State, recommended planting black walnuts for fence posts. The heart wood is very durable and the tree grows quite rapidly under favorable conditions. Then, perhaps when the trees are large enough for posts, the owner will decide to keep them for the nuts and for timber production.

During the past summer the College made a study of native nut tree plantations in the State with a view to determining the profitableness of such plantations.

Among the older plantations studied was one in Berrien County. It was planted 45 years ago and covers four acres. The soil is clay and loam with a clay sub-soil. Three year old seedlings were used with an average spacing of about 28 by 32 feet. The grove was cultivated for about 8 years after planting. The trees are now in fairly good condition but many are affected with heart-rot. They are quite spreading and bushy in form and are not suitable for lumber. There is now about 30 cords of wood per acre. The average diameter is 20 inches with an average height of 60 feet. The ground is sodded over and the grove is used for grazing sheep. The owner says that about half the trees bear and that the June bugs are the principal source of trouble, eating the blossoms. The yield in nuts varies from practically nothing to 25 or 30 bushels for the entire plantation. About six years ago, the owner reports a crop of 36 bushels, and two years ago a crop of 27 bushels. From these figures I should say the plantation is a success.

A chestnut plantation in Van Buren County was set 37 years ago and covers one acre of sandy soil. The plantation was cultivated for about ten years and corn was grown between the trees. The average tree is 14 inches in diameter and 65 feet tall. The returns have been small because the trees were planted too close together, but some years the plantation has yielded 15 bushels of nuts. There are 67 trees on the acre, which is too many for good nut production. The grove will produce about 20 cords of wood or about 550 split fence posts per acre.

One of the oldest plantations in the State is 56 years old and covers 1 1-2 acres in Montcalm County. It consists of black walnuts and chestnuts mixed together. The average black walnut is 14 inches in diameter and 67 feet tall. The average chestnut is 20 inches in diameter and 60 feet tall. The spacing is about 40 by 30 feet and the soil is a gravelly sand. The yield in nuts has been quite small, six to eight bushels a year.

There are a number of such mixed plantations in the State and it would seem that the two trees do not do very well together. In this case, I should say that the soil is not well suited for either tree.

There is a plantation of Japanese walnuts in Oakland County. It is five years old and on sandy soil. About 500 trees were planted at the cost of 60 cents per tree. The stock came from Pennsylvania and was budded to English walnut. The scions died back, however, and the plantation stock came along so it is now a Japanese walnut grove. The average tree is about 2 inches in diameter and 10 feet tall. The trees are very healthy and vigorous and are beginning to bear a few nuts.

A chestnut plantation in Van Buren County is 12 years old. Two foot transplants were used and the trees were planted at the rate of 100 to the acre. They were cultivated for two years. The average tree is 4 inches in diameter and 20 feet high. The trees are healthy and in good condition. The grove is yielding from one to two bushels of nuts a year and should be thinned so as to open it up and encourage nut production.

A black walnut plantation in Ingham County, planted about 20 years ago for timber purposes and underplanted with white cedar to force the trees to grow straight and tall, is in excellent condition. The average tree is 5 inches in diameter and 34 feet tall. The plantation has not yet borne nuts but if it were opened up, would doubtless produce a large number in a few years.

I could give more instances of nut tree plantations in the State, but I think I have mentioned enough to show that our native nut trees can be profitably raised. During the last few years, a great many black walnut plantations have been established but most of them are yet too young to be in a bearing condition. If it were not for the difficulty of getting healthy chestnut stock, I believe Michigan would be a large producer of these nuts.

A study has been made of the volume of the wood that could be obtained from these chestnut plantations. Owing to the open nature of the groves, the trees are mostly not suitable for lumber and the yield of cordwood and posts is less than in a forest plantation where the trees are closer together and force each other to grow straight and tall. It was found, however, that a chestnut grove planted for nuts, would yield on the average 13 standard cords of wood per acre at 20 years of age, 20 cords at 30 years, and 25 cords at 40 years of age. Placing the value of this wood at present prices of $7 per cord, would give a value of $91 per acre at 20 years and $140 per acre at 30 years for the wood alone.

Probably most of the chestnut plantations have been planted for the nut and the black walnuts for timber with the nuts as a side issue.

Black walnuts should be planted on fairly fertile, moist soil. We do not recommend planting the nuts as squirrels are liable to dig them out. It is better to use small trees.

The cost of establishing black walnut plantations is quite small. Native trees can be bought for $15 per thousand one year old seedlings. We prefer to plant these small trees as the black walnut develops a strong tap root early in life, making it difficult to transplant large trees.

Only a comparatively small number of hickories have been planted in this state. This is a tree that, while it grows slowly, is very valuable for its wood and it is becoming very scarce. It should be planted more extensively. It may well be planted in openings in the woodlot. Every farmer knows the value of hickory and the trees can be utilized when quite small.

It is needless to say anything about the value of black walnut wood. High prices have been paid for standing trees and for saw logs. Many individual trees have sold for $500 apiece and even more. Prices as high as $120 per M board feet have been paid for standing timber.

At the present rate of cutting, it is only a question of a few years before all of the merchantable black walnut will have been removed, and, unless trees are planted, the black walnut will be a thing of the past. It cannot be depended upon to reproduce itself in our forests as do the maples, the ash, and many other trees with nonedible seed. For every black walnut tree in our woods and along the roads, there are innumerable small boys and squirrels who are after the nuts and the seed have little chance of germinating even if they do get into the soil. If there are to be black walnuts in our future forests, the trees must be planted or the nuts planted and properly safeguarded. From a forestry viewpoint, the black walnut is a good tree to plant. It has a high value and the demand for the wood is very great. And, for planting, trees should be chosen that will give a good quality nut as far as possible.

For ornamental planting, too, nut trees may often be chosen to advantage. For the farm yard they are often the best choice. Hickories or black walnut are long lived trees and the hickory is very ornamental. A great many trees have been planted by the school children of the State; and right here is a good field for planting, around our school houses. The average country school ground is a forlorn place, usually barren of both grass and shade. While we perhaps cannot have a lawn, we can certainly have shade trees, and the children will take care of them and watch their development with interest, particularly if they have a part in planting them. A few years ago the College distributed about 6000 trees to the schools of the state for Arbor Day and many of these trees were black walnuts. During the last few years, the College has not raised enough of these trees to meet the demand.

As memorial trees, also, nut trees are being quite extensively planted. A great many black walnuts have been planted in the honor of our soldiers who gave their lives in the war and it is a very suitable tree to plant for this purpose.

Now that our forests are becoming more scarce, we are beginning to appreciate more fully the value of their products. Nuts, extracts, maple syrup and many minor products are obtained from our native trees. If man could be surrounded with the right assortment of trees, he would need little else. He would have food in the nuts and fruit; fire wood and building material in the stems, as well as paper and clothing from the wood pulp. He would have sugar from the sap, medicine from the bark, and he would have wood distillates, turpentine and resin. He could live long and well on the products of our forests.

Our forests are, however, disappearing. Our native nut trees are being cut off. Our sugar maple orchards are being put into farm land, and forest products are increasing rapidly in price. We have got to keep a certain part of the country in forests in order to have the country prosperous, and to do this we must either plant trees or so manage the existing forests that they will renew themselves naturally. In planting trees, we should not overlook the by-products of the trees, nuts and syrup and bark. These products are often the main crop in themselves and in any case, they will increase the receipts and make our forestry work more profitable.

There are many acres in southern Michigan and along the Lake, that will give larger returns from nut tree plantations than from any other source. We want first to be sure that the trees are hardy to the locality before we recommend them. I believe there is a very big future for such plantations. The history of southern plantations has been one of remarkable success.

We must be particularly careful in advising the establishment of nut tree plantations. We ought to be particularly careful in not encouraging people to buy trees that we are not sure will succeed. For every plantation that fails means a loss of money and an obstacle to future progress. But every tree that succeeds means an advertisement for years to come.

I do not see any reason why southern Michigan cannot raise many improved varieties of black walnut and perhaps some other nut trees as well. Our study of native nut tree plantations this summer, shows that with proper care they may be very profitable and we hope to see a great extension of such plantations in this State.

Prof. Chittenden: I would like to say that the College has been very favorably impressed with the work that this Association has been doing and the care that is used in recommending nut trees. It is a thing the people need a lot of advice about. I thank you. (Applause).

Mr. J. F. Jones: I would like to ask if the pecans that were tender were northern or southern pecans.

Prof. Chittendon: We got them from a nursery in New York State and I could not say as to the source of the stock beyond that.

Mr. Jones: Naturally the southern source is the cheapest tree.

Prof. Chittenton: We got the trees from a nursery that had been advertising them very extensively in Michigan. It was about five years ago, at a time when this State had been flooded with literature from this nursery and other nurseries about particularly pecans and chestnuts. We were doubtful about the trees they were recommending, and we got a considerable number and planted them out, but we took pretty good care of them; but they all died in winter.

Dr. Morris: It is a pity that people who do the most advertising have to. Certain firms are not allowed to advertise in nut journals at all. I think the public ought to be made aware of that fact. It is a pity too, because the ones who spend the largest amount of money in advertising are the ones of whom we ask the most questions.

In regard to Prof. Chittendon's paper, it is a very important matter to impress upon children and others who are setting out trees the idea that a tree is not able to care for itself as a rule. It is quite the exception for a tree set out by itself to thrive and enter into competition with other trees and bushes and shade, in the early years, and insects later. I suppose the number of ordinary trees including maples that make their way to a successful old age would not represent one in many hundred thousands that make a start in the sprouting seed. That fact ought to be impressed on every school child who is setting out a tree—he really should adopt that tree and make that its own child. And if you can inculcate the maternal and the paternal instinct along with the setting out of from one to six children of these other children, you will then get trees on your roadsides and your waste lands, and without a great amount of difficulty. But you have got to go back to first principles there and realize that very few trees are able to succeed after they have been set out unless they receive a great deal of care subsequently. Those of us who give a great deal of attention to trees, who pretend to care for our trees, will lose a percentage so large that I would hardly dare state what it probably is. Among the hundreds and thousands of trees I have set out, all from reputable nurserymen or raised by myself, I doubt if 25% are alive today, and I have pretty good success too. This is not to discourage anyone; it is to encourage people, and they are to be encouraged by knowing the facts; and when all the final facts are known about the values of trees that are given proper attention, then people will be willing to give them that degree of attention. Not until then are we to have success in filling our waste lands with **nut trees.**

Prof. Chittenton brought up one point of a great deal of consequence. In any locality plant the species which belong to that locality. The species which, by natural selection and adaptation have fitted themselves to the environment are, as a rule, the trees which will do best in that locality. That is a principle I think which ought to be thoroughly well fixed in mind. One may experiment with any number of trees from a distance, but the trees which naturally have adapted themselves to a locality, the species which have done that are the species upon which we can expend our efforts to the best advantage.

In the matter of chestnut blight, we assume that the chestnut blight will act like measles blight, scarlet fever blight, or any other epidemic. In other words, it is due to a microbe, it is due to a peculiar microbic group, a peculiar family group which happened to start out in northern China on its invasion and got to this country where it found trees which were not resistant. The American and European trees are not resistant. Wherever it has gone from northern China, from the place where blight, the tree host and enemy grew up side by side and represented the survival of the fittest; wherever it has gone away from the place where we have the survival of the fittest, at any rate as a result of struggle, there it has found susceptible individuals that it has destroyed. When a blight of any sort sets out, chestnut blight, measles, scarlet fever—any blight you please, you are talking natural history, you are taking biology, about an animal or a plant, about a microbe, a living thing. All of these living things run out of their vital energy in time. Each microbe runs out of its energy just as a breed of horses or of strawberries runs out of its energy. All varieties, varietal types, run out of their natural energy; so that it is simply a question of length of time before this family microbe or family group of this microbe will lose its energy. We do not know how many years that will be. It may be a great many years, and by that time, our chestnuts may practically have disappeared. We can find here and there a tree which resists better than others do, and we may find some with enough resistance to be worthy of propagation as of that resistant kind. We know that several species resist the blight very well. I found four species that resist the blight very well among six kinds I have tried out on my place. But some chestnuts bear so early and heavily that we may afford to set them out, even in the presence of blight, trimming them back and looking after them carefully: For instance, a number of Sober Paragon chestnuts that I planted all died but one that is near the house. It bears so heavily that it is well worth while, and it simply means that one must give a great deal of attention to it. Some people can afford even to set out the Paragon because of its high bearing power. I have a number of hybrids which resist the blight very well. The cross between the American chestnut and the Japanese, or between the common American chestnut and the chinquapins showed the resistance very largely of the resistant parent. But curiously enough, the ones which look most like the American chestnut also carry that parent's weakness in regard to blight, so that all of my hybrids between the American chestnut and the resistant kinds which look like the American chestnut and act like it also catch the same microbe for the most part. But one of the hybrids does not. No. 2 which I have given Mr. Jones, is very much like the American chestnut. It grows vigorously, acts like it, and looks like it, and it has not blighted up to the ninth year of age, beginning to bear about the fourth year. Most of those that are like the chinquapin or like the Chinese chestnut resist blight very well.

About Japanese walnuts. If Prof. Chittenden has a large number of Japanese walnuts about the state, he may very well select one or two of the very best and advise the owners to top work the others with the one or two which happen to be particularly good. Most of the Japanese walnuts are small. Most of them are Siebold type instead of the heart nut variety, but a few very large ones will be found here and there and of high quality, and they graft almost as easily as peaches.

In regard to Persian walnuts. If there are a few trees here and there about the state, we need not fear the question of introducing others because it is too far north. If you simply have one tree that is a good one, that is enough, because you can graft over all sorts of black walnuts, Japanese walnut and Persian walnut stocks with the one or two trees which are known to be good in Michigan. One good tree in the state which is bearing good nuts of desirable qualities is enough. Graft all of your other walnuts back from it. And in setting out the native black walnuts, chestnuts and the hickories of different species, it is important always to distinguish in regard to intention—whether they are to be for forest purposes or for nut purposes. That is not always clear in the minds of a number of people whom I have seen setting out groves of these trees. They talk about getting timber and nuts. You can not get both profitably. I think people ought to be impressed with the fact that if they are setting out apple trees for timber they would set them five or six feet apart. If they are setting them out for apples, they would set them sixty feet apart. Precisely the same thing is true of nut trees. (Applause).

Mr. Jones: I would like to ask Dr. Morris how he protects grafts the first year. Grafts growing the first year are very tender, put in late, and they will often winter kill in the tree that is perfectly hardy otherwise.

Dr. Morris: Mr. Jones is quite right about that, and that is a matter requiring more experience than I have at the present time. What I have done in the way of protection fairly well is this: For instance, if I graft Persian walnut on black walnut and it makes a late start and then in September has a very sappy growth, or in October has a sappy growth of three or four or five feet (they grow tremendously fast, like weeds) if the bark at the base of the graft is brown or has two or three buds that are brown or partially ripened, I cut off four or five of the first leaves and let them harden. Then in the fall I cut off all but those four or five buds and put wax over the end. That is the way I avoid the winter killing of the sappy growth. As soon as the part nearest the grafted place begins to turn brown, looks like hardening up and two or three buds are pretty hard. I cut off four or five of those leaves right there and let the buds ripen, and those buds will ripen very well. I will sacrifice five or six buds for the sake of saving three or four buds. The next year they grow all right. That is not a nice way, but when you see you are going to lose a thing on account of sappiness, that will sometimes work.

Mr. Jones: I generally wrap the base of the limb in burlap.

Dr. Morris: If the sappy tip dies, it poisons the rest. There are poisonous enzymes that poison the rest of it.

Mr. Bixby: I was going to ask Prof. Chittenden if he could give any experience with the named varieties of black walnuts.

Prof. Chittenden: I don't think I could distinguish between the varieties of black walnut that have been planted in this state. That is not a thing that I feel able to discuss. I know that a number of different varieties of black walnut have been planted. At the College we have done a good deal of grafting on the black walnuts, and we have not had very good success.

Mr. Bixby: I had in mind improved varieties of black walnut grafted on the black walnut stock.

Prof. Chittenden: I don't think we have had any experience of that. We always get a good deal of wood from Pennsylvania in the spring and do the grafting in class. We can not expect a very high grade of work when the students do it as a part of their work of instruction. There are some black walnuts in the state that have very good nuts, and some that have not. I have tried to get for our nursery good nuts from trees that had a good native nut. We have had so much difficulty getting black walnuts at all the last few years that we have taken just what we could get. We get nuts from all over the central part of the state and plant in the nursery to get our seedling trees.

Mr. Bixby: I have found some of the named varieties of black walnuts bearing in quite a number of sections of this state and other states. They seem to bear quite young.

President Reed: Mr. Jones has partly prepared a paper on "Pecans other than those of the well known sections," but as it has been impossible to complete it. it will be handed to the secretary later. and inserted in the proceedings.

PECANS OTHER THAN THOSE OF THE WELL KNOWN SECTIONS

J. F. Jones, Lancaster, Pennsylvania

Pecans have been grown in the South for a good many years. and. with the advent of budded and grafted trees of superior varieties in more recent years. the industry made great strides and now that the product of some of these grafted orchards is coming on the market and selling readily at high prices, the economic value and importance of the pecan is becoming to be more fully appreciated.

The success of the pecan in the South, led some planters in the northern states to make experimental plantings of these southern varieties but they have proven disappointing, as might be expected. since our seasons are too short for the nuts to mature, even where the trees are hardy. I have seen the Stuart, one of the largest southern pecans. when grown in Lancaster and Adams Counties, Pa.. not half as large as the Indiana sorts and with little or no kernel. The Schley. one of the finest southern pecans, when grown in Adams Co., Pa.. is so small that no one would recognize it and it has no kernel at all.

In very recent years. largely through the efforts of a few progressive men in Indiana, fine varieties of the pecan have been discovered in Indiana and Kentucky, and these varieties are being propagated and planted over the northern states generally. While the discovery of these varieties and their propagation marked a big step forward in extending the cultural range of the pecan and making it possible to grow this nut several hundred miles north of the southern pecan belt. not unlike the southern varieties, the Indiana and Kentucky varieties are necessarily limited in their range of adaptability, and it is perhaps not safe to recommend them for planting, except possibly in the more favored localities, north of the 40th parallel and south thereof and possibly in the elevated or mountain sections they should not be recommended for planting north of latitude 38 degrees. The advantages of securing varieties for propagation therefore from as far north as possible is obvious.

I have examined a good many sample pecans from Missouri and Kansas, some of which are excellent, but, aside from possibly being a little hardier in tree, they have no advantage over the fine Indiana and

Kentucky varieties that we already have, unless of course. they should be better adapted to planting in the western states.

In its natural range, the pecan is found growing farther north along the Mississippi River, in Iowa and Illinois, than anywhere else in the country. and naturally we turned to these pecan forests hoping to find a variety bearing nuts of a size and quality to merit propagation and dissemination north of the belt where it is safe to recommend the planting of the Indiana varieties. As a result of correspondence with an Iowa nurseryman in the fall of 1914, I engaged the services of a competent man to gather pecans for me at Muscatine, Iowa. Following my instructions, this man searched the woods in that locality to find what I wanted for propagation and as a result. nuts were sent me from several trees which were carefully marked so that in case scions were wanted from any of the trees, they would be readily identified. This man seemed to be very enthusiastic about the nuts he sent me. and, as he had made a business of gathering pecans and he knew the pecans in that section well, I felt that he had sent me the best that he had there. None of the pecans sent had sufficient size and merit to propagate however, and I gave the matter up. Fortunately, Mr. G. H. Corsan, Toronto, Canada, was endeavoring the same fall or winter to get pecans to grow trees that would succeed in Canada and he bought pecans from a dealer in Burlington, Iowa. Upon receiving this lot of nuts, Mr. Corsan was astonished at their large size, as he expected that pecans from the northern limit of the pecan to be of small size. Thinking that this party had sent him southern pecans, Mr. Corsan wrote him at once that he did not want southern pecans, explaining that he wanted them for planting. This party replied that the nuts sent him were genuine Iowa pecans. Knowing my interest in the matter, Mr. Corsan wrote me during the spring of 1915, giving me the facts in the case and urged that I go to Burlington the next fall and look up a variety for propagation. Fall came on, but with it, so much to do and with short help, due to war conditions, that I had to give up the trip, but, at Mr. Corsan's suggestion, I took the matter up with Mr. Ed. G. Marquardt, Burlington, Iowa, with the result that the matter was placed in his hands, with the assurance from Mr. Marquardt that he would do the very best he could for us. Mr. Marquardt employed a man who had made a business of gathering pecans there and who knew the trees bearing the largest nuts, and with the help of this man, finally located a tree 20 miles north of Burlington bearing very large pecans of thin shell and splendid quality. Although most of the nuts had been gathered, the husks on the ground indicated it had been bearing good crops. This tree was marked and some of the nuts sent to me. These pecans I considered remarkably fine for so far north. They were fully as large as the Indiana, with even a thinner shell and a full kernel of excellent quality. With the help of Mr. Marquardt, scions were secured from this tree the following spring, and grafting proved very successful, which we consider very fortunate, as this land was cleared during the war and this tree met the fate of others, being turned into lumber and it is no more.

This variety has been given Mr. Marquardt's name. Coming from 20 miles north of Burlington, Iowa, in north latitude 41 degrees, I shall expect the Marquardt to succeed any where south of the Great Lakes. The Indiana and Busseron pecans originated farther north than any others of the Indiana group, the original trees of which are growing in the Wabash River bottom, west of Oaktown, Ind., about 10 miles south of latitude 39. Most of the Indiana and Kentucky varieties are from latitude 38 degrees, or approximately 200 miles south of where the Marquardt originated. The climate of Iowa is also considerably colder than is the same latitude farther east, due to the more open character of the country west and to the influence of the Great Lakes farther east. The pecans there are not only necessarily hardier, but have to mature their fruit in a shorter season, which is all important in a variety for northern planting, as it has been shown that the pecan is hardy in tree considerably north of where it will mature its fruit properly. Realizing the importance of the Iowa pecans for northern planting and realizing the building of the big power dam on the Mississippi River at Keokuk, Iowa, and the consequent raising of the water level for considerable distance up the river together with building of levees and clearing of the forests, threatened the destruction of many of the pecan trees and pecan forests, Mr. Bixby spent nearly a week during the past fall in the pecan forests and groves along the Mississippi River around Clinton, Ia., and Burlington, Ia. The facts of the following paragraphs (except the last two) I have taken from his notes:

These pecan trees at Clinton, Iowa, are the most northerly growing of the native pecans so far discovered. They are on the islands in the river and on the bottom lands, where the land at low water is only a few feet above the water level, and at high water, several feet under water. The trees certainly are not suffering from lack of moisture. The soil is alluvial, seemingly of unknown depths and must be very fertile, enriched as it is by the deposits left by the high waters each year, or sometimes, several times a year. No pecan trees under six inches in diameter were seen here, and they ranged from that size up to 24 inches in trunk diameter 85 feet tall. No trees bearing large pecan nuts were seen, although the flavor of the kernels of practically all of the trees was good. Crops of nuts were irregular and seemingly not so good as they were some years. None of the trees near Clinton were deemed worthy of propagation.

The pecans at Burlington are growing under similar conditions to those at Clinton, but they are much more numerous, there being thousands of them, some being larger than any seen at Clinton. Four trees, including the Marquardt, have been discovered and brought to the attention of the association by Mr. Ed. G. Marquardt and Mr. John H. Witte of Burlington. Cuts of these nuts, natural size, are shown opposite page 48. The Marquardt is being propagated by me and the other three varieties by Snyder Bros., Center Point, Iowa.

From the appearance of the leaves, buds and habit of growth of the Marquardt pecan, it seemed to me that the tree had hickory blood in it, although the nut did not suggest it; and I intended to look into this matter fully, on a trip to Iowa the past fall, but finding I could not go, I gave Mr. Bixby samples of the nuts, leaves and twigs and told him what I expected, and he had this in mind during his trip. He never found young pecan trees growing in the woods but did find them growing in large numbers on the levees and on the edges of cultivated fields. A careful examination showed a very considerable variation in leaf, bud and habit of growth and there seemed little question but that there were among them many hybrids between the pecan and the big bottom shellbark, *Carya laciniosa,* which is found growing on the bottom lands and the islands along with the pecan. As a matter of fact, two of the four Iowa pecans selected for propagation, the Burlington and the Greenbay, show unmistakable evidence of hybrid parentage in the nut, in the leaves and buds. The Marquardt gives no hint of such parentage in the nut, but the leaves and buds do suggest that it has hickory blood in its make up, and it is believed that this is so. The Witte is seemingly a pure pecan.

There has recently been much done near Burlington in reclaiming valuable, cultivatable lands from the river which formerly overflowed them each year so that people were afraid to plant crops and they were therefore abandoned to the forests. Levees have recently been built to keep the water off these lands in time of high water. Drainage ditches have been made behind them and pumping plants put in to pump the water out of them. The cost of these improvements, which has given to cultivation much very fertile land, has been assessed on the owners of the lands benefitted, as is also the up-keep expense. Many owners had not the money to pay the assessments and have sold the land to those who are clearing off the timber. This means the clearing of thousands of acres of bottom land and the pecan is one of the principle trees on these bottom lands. This condition makes it necessary to locate and propagate at once, the best and most promising of these Iowa pecans and hybrids and observe their behavior afterwards in the young trees, instead of depending on the watching of the behavior of the original trees as has been the case in Indiana.

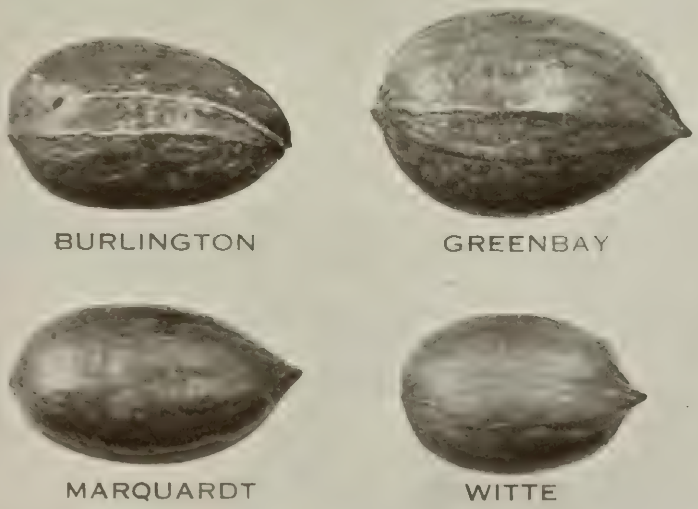
I feel reluctant to close this address without mentioning the good work done by Secretaries Deming and Bixby and other members of this Association in searching for varieties of nuts that may be superior to what we already have. Those of us who are propagating these trees, while we may feel the inspiration that comes from doing a work that benefits mankind, nevertheless, we hope and expect to make dollars and cents out of growing these trees, while this is not the case with some of the members of this Association who are not nurserymen and who do not expect to enter this field.

Dr. Deming, former Secretary of this Association, did much good work and secured some fine nuts worthy of propagation, through advertising and the offering of premiums, and Mr. Bixby, who very kindly took up this work when Dr. Deming was called to the colors, has been active and is doing a great work for northern nut culture.

PRESIDENT REED: We will now have a grafting demonstration by Mr. Jones.

Mr. Jones had brought with him specimens of stock, scions and all the materials and tools needed for the demonstration, and performed the various operations of grafting and budding before the audience.

MR. JONES: We often use scions half or three-fourths of an inch in diameter, for grafting, but they are rather hard to get. In top working, we generally take limbs two to four inches in diameter, cut them off, and split the bark. The nut grafting must all be done late when the sap is up in the trees. Cut the scions all on one side. Split the bark, slip in the scion, tie up and wax the whole scion over with grafting wax, put it on hot and seal it up tight. Sometimes for winter protection of the English walnut as far north as Michigan your tip might kill back because it grows so very fast and is sappy. I have never



BURLINGTON

GREENBAY

MARQUARDT

WITTE

PECANS FROM BURLINGTON, IA.

had trees kill in that way, but I do have many people write me that they have trees killed in that way. In nursery grafting, we usually use just the cleft method. You should cut the cleft on one side and don't split it, but keep it smooth all the way through.

President Reed: You get better results, Mr. Jones, from waxing the entire scion?

Mr. Jones: Yes, we get better results that way. In the South we have no success at all that way; we have to cover them with sacks.

Voice: About what degree of heat is best for the wax?

Mr. Jones: Don't have it too hot and it can't burn. You can tell that by the wax smoking.

President Reed: As long as the wax does not smoke, it is pretty safe.

Mr. Jones: This illustrates what we call a side graft. Put the scion in the side and leave the top on. You can also do it in bark grafting. Cut your bark, split it, and stick your scion straight down as it is here.

Voice: How do you apply the hot wax?

Mr. Jones: With a swab or brush. We use a carbon heater and that makes it about the right temperature.

Voice: How large black walnut trees could be top worked to English walnuts?

Mr. Jones: You can work almost any sized tree, but it is quite a job in the large tree. Take a tree larger than six inches in diameter, or eight, and it would not be very satisfactory. In cutting the scions be careful to make a straight surface on the cut bevel. To do that the knife should be held at an angle lengthwise to the scion. In our grafting in the South we leave the scion dry and cover it with a bag. That was in Florida.

Dr. Morris: That is a very interesting question about the limits of our using the method of covering the scion and all with the wax. I shall speak of that in my own grafting demonstration which is short. I got the point from Mr. Jones, and Mr. Jones tells me he got it from Mr. Riehl. They use black wax and hard, strong wax.

Mr. Jones: Mr. Riehl uses a liquid wax, resin and beeswax without the coloring matter. We use the coloring matter to toughen the wax.

Dr. Morris: Still, that is amber. Amber will cut out light, and it seems to me that it is a matter of a good deal of consequence, the black or amber wax covering the graft completely, buds and all, wound, scion.

stock. It succeeds in the North, succeeds better than any other method in grafting, and yet in the South it does not succeed. It is possible that as you get further south the longer sun, the hotter sun scalds the cambium layer of bark beneath when it would not do so in the North. That is at least worth thinking about. In my own work during the past year I have used transparent paraffin alone, nothing else. I have tried different kinds of paraffin, the Parowax, the common one that the women put up preserves with is the one that will stay on best, will not crack and is perfectly transparent, allowing the light of the sun to act upon the chlorophyl, in the bark and the bud and intensify the activity of that part of the plant that depends upon light transformation by means of chlorophyl. I am very much interested to know if this will not succeed in the South. Paraffin would not attract the heat of the sun, and it is possible that this will allow us to carry the method of Mr. Jones, the best method to date, still farther south.

Mr. Jones: I think, Doctor, it is a matter of heat, because in the shade you can graft them almost any way. Do you cover the scion with paraffin or only the union?

Dr. Morris: I cover the entire thing with paraffin, scions, buds and all including the wrapping. I don't leave anything exposed to the air. There are several principles involved there. In the first place you have the effect of light upon chlorophyl which is important; in the second place, the melted paraffin fills all interstices in which sap would collect and ferment. If those interstices are filled with melted paraffin, sap will not collect there and ferment. The microbes of bacterial and fungus origin, that prevent union and break down the products of repair that are thrown out for the purpose of repair, can not do it if they can not collect in quantity, and the paraffin fills the space in which they would collect in quantity; so that does away with another one of the dangers. In the third place, you have the same sap tension maintainied in the scion as in the stock. The difference between the negative and positive pressures, day and night, is very great in spring time, and as the sap responds between day and night in the stock, it puts a strain upon the scion. The scion can not follow the stock with its sap movement ordinarily. But if scion and stock are covered completely with paraffin, the tension remains the same, so that you do away with the shock of varying negative and positive pressures. That is an important point, it seems to me, in principle in the matter of using the paraffin. Another point is this. You prevent evaporation from scion that goes on ordinarily through the little breathing lenticels, the little apertures between the cells of the bark which allow moisture to escape as well as to enter. One would naturally believe the paraffin would fill these and smother the scion, and I presume it is that fear which has prevented the world from trying this for the past ten thousand years, because they were skilful grafters in Egypt, both in the tree world and the financial world, in the days of Hammurabi there were skilful grafters in both worlds two or three thousand years before Christ. I suppose that fear of closing the breathing apertures in the stock has prevented people from adopting this method; but it is not justified, because those bold, brave nurserymen who are not afraid to smother a scion find that all the scions live. It is a venture into the unknown, that dramatic book, in the way of dramatically constructive progress. Another point: When you protect your graft in the ordinary way with ordinary wrapping, ordinary wax, the scion becomes timid, the stock becomes timid. It is not quite sure of itself in many cases, and when it is not sure of itself, when it has a fear, what does it do? It resorts to the protection method. What is the first? Suberization, cork layer formation. So the frightened stock throws cork cells over its cut surface between that and the graft, and the suberization goes on as a result of fear on the part of the timid stock. When you have taken away the fear by covering the whole area with melted paraffin and it feels safe, then suberization does not go on in this way, your stock is not frightened, you have not a scared tree at all, and it will go on kindly and gently as a Jersey heifer to do its work.

President Reed: I would like to ask Dr. Morris about that myself. I am very much interested in the line of grafting, as we graft 50,000 to 100,000 every spring, using this same method. I feel as Mr. Jones does, that the losses from grafting are largely due to heat and the fermentation of sap. We find perhaps, that the first week of grafting in cherry, we can almost invariably secure a fairly good stand. Following that it tapers as the warmth and air increase, although the scions are kept in cold storage, perfectly dormant, the sap is coming up, and the increased rays of the sun—we get a very small percentage, and it seems to become less every day, and we have always used the dark wax. While I have been using paraffin wax a good deal of the time, I put lampblack in it for coloring.

Dr. Morris: I have until this year. In order to get Mr. Jones' points, I tried to work out the philosophy of the subject and see what values there are, what meanings in the methods which led to his success. Then following that line of investigation, I stopped into another line of observation, and arrived at the transparent paraffin method, so that this is the first year in which I have tried it, but the results are perfectly remarkable. I have only done it for a year, but you will see 100% of catches on almost everything, hickories, walnuts, hazels. I must tell you of one very remarkable incident. Mrs. Morris had some dwarf trees set out on the slope of the lawn, dwarf pear trees. One of my men cut one of them off with a lawn mower the latter part of August. The top kicked around under foot for three or four days, wilted in the sun. We were walking past it along in August. I think Mr. Bixby said, "Why don't you try grafting on that kind of material?' I said, "I will, blessed if I don't." So I cut three pear scions from this wilted top that had been cut by the lawnmower in August, and I put them on a scrub pear tree under the fence near the house. And I tried this paraffin method, and in about six days one of them started out a shoot, and I said to one of my men, "We will transplant this. This is no place for it." I meant in the spring, or in a year or so. He transplanted it the next day. And it grew I think about half an inch after that, made good wood to last through the winter. So I don't know what the limitations of this paraffin method are. But that is a thing I would hardly dare tell about unless there were men here in this room who had seen it. That little pear top, cut off by mistake, kicked about under foot a few days in August, no sort of scion that any one would ever think of using as a graft, put it in as a joke, and with the further abuse of being transplanted; but it started growth, and now it is going to be a good pear tree.

Mr. Jones: The kicking around only made it good for grafting.

President Reed: Perhaps it ripened up to a certain extent by that drying out, like it would in the fall.

Dr. Morris: Maybe, but I have never heard of horticulturists propagating trees in that way and transplanting them in the same year, and having the new wood from the graft harden for the winter.

Mr. Jones: Mr. Reed spoke of grafting a cherry. You cut the top off didn't you?

President Reed: Yes.

Mr. Jones: We graft filberts by leaving the top on and cut the graft in on the side and wax it over. We leave it there two weeks, maybe, and cut it off, and we get perfect stands that way, and you would on the cherry.

President Reed: We use the side grafting, but we cut the top off.

Mr. Vollertsen: I would like to ask Dr. Morris with regard to the stock. Don't you think the fact that that tree was moved at the time it was, so soon after grafting, had something to do with the retarding of the sap and causing the tree to mature the wood it did in place of making more growth?

Dr. Morris: That might be. All of the expert horticultural opinions brought to bear on this are valuable. Every suggestion that has been made has had a meaning. It requires explanation.

President Reed: If there is nothing further along that line, we have with us Mr. Conrad Vollertsen, of Rochester, who has been asked to prepare a paper; and we would like to hear from him. He is an expert in the filbert, and I believe can give us some valuable information. (Applause).

HAZEL NUTS AND FILBERTS

Conrad Vollertsen, Rochester, N. Y.

Mr. President, Ladies and Gentlemen of this Convention: I have been approached by a member of the Northern Nut Growers' Association to prepare a paper to be read at this convention on the growing, cultivating, and propagating of the European hazel, together with such other topics on the subject, as would be of interest to the members of this association, particularly my experience and observations during the last three or four seasons in my hazel orchard and nursery.

Now, Ladies and Gentlemen, I am not a public speaker nor a public writer; my business is nursery and garden work: I can use spade and pick more freely than pen and ink, and, therefore, fear that I am not the right party called upon, knowing as I do, that we have members in this association far more capable and experienced, and who possess more knowledge about the European hazel than ever I had. Nevertheless as the growing and planting of the European hazel in the eastern and middle states of our country so far, both for ornamental or commercial purposes, has been more or less experimental, I think all practical information on the subject should be welcomed, and therefore I have consented to prepare this paper and hope it will be accepted for what it stands.

A number of years ago, after leaving school, I entered a large nursery and garden establishment in Germany, as an apprentice boy, to learn the garden business, to become a gardener and horticulturist, to learn how to raise trees and other plants, to learn how to graft, to prune and cultivate, and, in general, to take care of all kinds of growing plants. One of the first duties bestowed upon me in my new place was the charge of a large plot of young hazel or filbert plants. To prune or graft them? Not at all. At that time I did not know anything about such skilled labor. I was merely told to weed and hoe them and to keep them clean. It was not just very elegant work, but, ladies and gentlemen, I enjoyed very much indeed, every minute so employed among those young filbert bushes. I became really attached to them and knew practically every plant in the plot, and almost believe they knew me, too.

Now what was the reason for this immense pleasure I found in working among those plants? Was it perhaps from the commercial or financial point of view, the future income from them for fruit or when the plants reached a saleable age? Not at all. I was then too much of a boy and did not comprehend such a thing as that. It was merely the fond and pleasant recollection of my childhood, of my boyhood, when, together with other children, in the proper season, we went hunting for the common hazel nuts, the *Corylus avellana,* as the gathering of these nuts is one of the greatest pleasures of the German country child, and to roam through fields and woods in late summer in those beautiful September days, when the foliage of trees and bushes begin to color, when the birds of the garden, field and forest begin to assemble for future migration, when goldenrod, asters and other field flowers are reaching their greatest beauty, then, ladies and gentlemen, the hazelnut has reached maturity. The nut itself is a very beautiful brown color, the outer bark a golden yellow, the leaves of the plants slightly colored with bronze, pink or yellow, a most beautiful combination, a pleasure to look upon, and a sight never to be forgotten. Whoever has had an opportunity to see and admire a well fruited hazel plant, at the time of maturity, will agree with me that it is a thing of beauty, not only during the fruit bearing season, but in fact throughout the whole winter, with the handsome staminate flowers or catkins appearing very abundantly in early fall, and remaining throughout the winter, until late spring. Of all these pleasures, these beautiful sights, etc., of which a vivid and fond recollection caused all the pleasures in cultivating the above mentioned hazel lot, we need not be deprived in our otherwise so richly blest country. It is true that, at the present time, we have no American native hazel, that can fully compete with the better European varieties, but we hope that in time not far off, through scientific hybridization, such will be produced. For the time being, we have some very fine European varieties as a substitute, which for years have stood the test very well. and should be planted wherever a place can be spared for a few of them. and great pleasure and enjoyment will be the result. So much for the pleasure of raising hazel nuts. I have related the foregoing merely to show the lasting pleasure and enjoyments derived from the planting, cultivating and gathering of a few European hazel nuts.

But to raise hazel nuts for the pleasure of it only, would be a very poor business proposition. and certainly not a paying one. What we should do is to raise them in large quantities, for commercial purposes. but here it seems to me the question should be asked: Have we had experience enough as to recommend the planting of them in the middle and eastern states for commercial purposes? In other words, is it worth while to plant them with that point in view? Now, gentlemen, I do not suppose that any one of us, at the present time, would be fully capable or prepared to answer this question intelligently or positively, as the planting of the hazel, for commercial purposes, has not been tried long enough, at least not in the eastern or middle states, to warrant a positive opinion on the subject. A great deal depends upon the variety planted, also the location where the planting is done. Much observation and experimenting is still required.

I have growing on my ground in western New York, near Rochester, several hundred trees or bushes, 6 to 8 years old, about 20 varieties, most of them German varieties, a few from France, and a few from England. They have been bearing nuts the last four seasons, and all have reached maturity perfectly. The smaller and medium sized nuts appeared to bear a little better than the larger varieties. The varieties received from France have, so far, not done well with me, as the German varieties. They are poor bearers. In the fall of 1917, I gathered from each 5 to 6 year old tree, of the German variety, about a pound and a quarter of the medium sized nuts, while hardly a pound from the larger fruited varieties (same sized plants) ripened well. I was then under the impression that the hazel not only could but should be planted in large numbers for commercial purpose. In the fall of 1918 my crop of nuts was very much less, and I had expected even a better harvest than in 1917, which certainly was discouraging to me. The plants themselves were growing beautifully, but most of the staminate blossoms or catkins were frozen, and, consequently, very little pollenizing was accomplished, and very little fruit the result. Such and possibly other occurrences, from time to time we may expect and look for, and should be ready to investigate thoroughly, before we can advocate or recommend the planting of the hazel extensively.

It really seems strange that while the hazel generally is at home in the northern latitudes, it should partly freeze when the thermometer reaches say about 12 to 18 degrees below zero, and, as I had never noticed that before, it then occurred to me that possibly another reason could be found, why so many of the catkins were frozen.

Through my investigation in the spring of 1918, I have come to the conclusion that the unusually wet season in our vicinity of western New York throughout 1917 caused the hazel plants to grow until the real cold weather was upon them, which gave the wood a very poor chance to ripen, particularly the terminal buds, where a great many of the catkins had formed, and caused not only them to freeze but also a certain part of the wood. Only the lower and more protected catkins came through the winter alright and caused what little pollenizing was done, hence the very light harvest in the fall of 1918.

Should the results of my investigation prove true, and the continuance of the wet weather prove the main cause of freezing so many catkins, then it seems to me there is nothing to be alarmed about, and the planting of the European hazel, at least in this vicinity, for commercial purposes could be conscientiously recommended, and should be done, the sooner the better. We do not expect our apple or pear orchards to bear an abundant crop every year, and we should not expect it of our hazel orchards. Something will occasionally happen to them as well as to other crops, otherwise we run no risk whatever.

My trees or bushes, several hundred in number, planted in 1912 and later, have stood all kinds of weather, extreme cold, very hot, continuous wet, and still are growing most beautifully at the present time. They gave a very satisfactory crop of nuts this last fall, 1919, in spite of severe freezing weather on April 25th and 26th when the mercury dropped to 12 to 15 degrees, and all hazel bushes in full bloom. At the present time the prospect for a good crop of nuts next season is certainly very bright.

Neither fungus, blight, or other diseases of any kind, or troublesome insects have so far been detected. In planting the hazel for commercial purposes, I should recommend 12 feet distance between the plants each way, as they require abundant sun and air. At the same time, there is an opportunity to use the land between the rows for several years to come, as low growing crops like potatoes, strawberries, beans, beets, carrots, etc., could be grown there to great advantage, and the cultivation of these crops would be amply sufficient for the hazel plants.

Now the selection of varieties to be planted for the commercial hazel orchard is a very important part of the undertaking, and should be well considered. To plant several varieties is absolutely necessary on account of pollenizing, as staminate and pistillate flowers, though on the same plant, do not always appear together in proper condition on all plants; in fact it has been proven in my orchard that sometimes plants bring forth a great many pistillate blossoms and not a single staminate one on them, and still a good crop of nuts were grown on them. Here the pollination must have taken place with the pollen from other nearby plants conveyed to them by wind or insects. One particular plant of the zellernut type grown in one of my city lots during the last season was very well filled with pistillate blossoms and not one catkin on it, and still it ripened a fairly good crop of perfect nuts, where the nearest plants filled with staminate blossoms was at least 30 feet from it. Here it is shown and proven that a number of varieties is a necessity.

But what varieties we shall choose, will undoubtedly be an open question for some time to come, and, no doubt, a great deal of experimental work will have to be done to finally select the right varieties for the different localities, the variation of temperature and location has very much to do with the proper selection of varieties. I have among my varieties some I could recommend and again others that are not at all satisfactory, at least not so far, and it requires more close observation before the very best of them can be picked out or selected.

Our next operation in the hazel will be the pruning. Here I should say above all things: "*Keep the suckers away.*" Hazel bushes are naturally inclined to produce a great many suckers, which should be thoroughly removed as soon as they appear; it will stop when the plants grow older. Besides the suckers, all weak and unnecessary wood should be removed entirely, not cut back. Our aim should be to try and get as near as possible low standard trees, with trunk say 10 to 15 inches high and the tree itself not to exceed 15 to 18 feet in height with the center kept open all the time. To accomplish this, I should suggest the removing of all crowding limbs from the center, regardless of their being fruit-bearing limbs, which to determine is mostly guesswork at the best. In order to keep the plants within 15 to 18 feet in height, the terminal shoots also should be removed or reduced as the case may be, beginning at the time of planting until the desired height is reached. After that, one or more of the old limbs may from time to time be removed, as there always will be enough young branches to take their places. Such pruning in my orchard, so far, has proved sufficient, as blight has never made its appearance in my nursery.

I will not be able to say much about blight. I have known trees in our city, 4 or 5 varieties, for more than 30 years, bearing more or less fruit year after year, and have never noticed any blight or anything wrong with them. Should blight appear, I should remove all affected limbs to the sound and healthy wood, as we would do to our pear and quince trees when blight appears among them. I do not believe that properly treated hazel bushes will ever suffer much from blight, at least not in our vicinity. Neither do I believe that any more pruning than I have outlined is required or necessary to our hazel plants.

The next subject about which I wish to say a few words is the propagation of hazel plants. There seems to be quite a difference of opinion as to the mode of propagating them; some advocate grafting, others layering, again others from suckers only. Grafting I believe myself, will produce a finer plant and the operation of doing so seems quite successful, but a great many varieties produce so many suckers that the graft is liable to be choked or crowded out if not constantly watched, and it should not be expected of the average person to know the difference between the graft and the wild shoot, and consequently, in a comparative short time, he would have a wild or common hazel. For that reason grafted plants should not be used for the trade until our people get better acquainted with hazel plants. I, therefore, should recommend layering, thereby having the plants on their own roots, which would prove more satisfactory everywhere. That grafted plants bear fruit sooner than layers, does not always hold good; it may be so with some varieties, but not with all of them. I have some three year old grafted plants and no fruit as yet, where I had plenty of layers in the nursery rows two years old well fruited.

It is true that plants grafted on seedlings of the *Corylus avellana* will not produce as many suckers, as plants grafted on layers of the avellana type, but they will produce enough to confuse the average person, as the foliage of some varieties are so nearly alike, that it actually requires an expert to tell the difference. I, therefore, under the existing circumstances, should advise the propagating of hazel plants by layers only, until our people get better acquainted with the hazel proposition in general. Why propagation by suckers only should be preferred by some people, I fail to see, as they are practically the same as layers, plants on their own roots from a parent plant, only that layers are produced a little more scientifically and suckers more naturally; otherwise they are identically the same thing.

When I referred to propagating, I should perhaps have mentioned the growing of hazel plants from seeds, that is from the nut, but I did not think it necessary. I will, however, say that plants raised from seed should never be planted for fruit bearing unless they are grafted or budded, as it has been fully and positively proven that plants raised from seed, even if the very finest nuts of our European hybrids are planted, will not produce nuts as good as those planted, but will almost invariably go back to the original type, the *Corylus avellana.* It is alright to raise plants from seeds for the sake of getting stock to graft or bud on, but, as to variety, the seedlings are unreliable.

Before coming to a close, I would like to say a few words about the fertilizing of the ground for hazel orchards and what experience I have had in this matter, as I believe this would be of interest to all. It is a well-known fact that hazel plants grow well and will thrive in almost any kind of soil, as long as it is not too wet or too heavy, but from time to time a little manure worked in is very beneficial both to old and young plants, but care and judgment should be exercised, so as not to overdo it. I have growing in one of my city lots with very fertile soil, several bearing hazel plants, 7 to 8 years old, different varieties. These plants grow so immensely that it plainly shows, they are growing at the expense of the fruit, not only that the quantity of nuts gathered from a plant there is considerably less than of same sized plants grown on ordinary farmland, but the quality also is very much below. My best nuts are all grown on ordinary farmland and the greatest quantity has always been obtained from the farm where only very little fertilizing or manuring had been done. For the growing of young plants for commercial purposes, for the trade, I should recommend liberal manuring at all times. (Applause.)

QUESTION: Is the hazel a long lived tree?

MR. VOLLERTSEN: I have known trees for almost forty years that are bearing good fruit year after year, although not always a good crop. They don't seem to grow so rapidly at that age as when younger.

DR. MORRIS: Hazels seem to graft pretty well on each other. I think the tree hazel is going to be our most successful stock for grafting. However, I have grafted on the *Corylus avellana.* The tree hazel does not put out any suckers.

QUESTION: Does the hazel find its way into the market commercially?

MR. VOLLERTSEN: I would almost think so. I have had lots of inquiries for them from storekeepers. It seems to me there are a great many imported around here. Our American hazels are not so very good. There may be here and there a fairly good one, but I have not found any really good ones worth propagating. I think if we would do more scientific work we could get very good nuts. There is no question that they are perfectly hardy and will stand almost any climate.

MR. JONES: Some of your varieties are hybrids aren't they?

MR. VOLLERTSEN: They are all hybrids. I have a few of the real, original *avellana* type I think got there by accident.

PRESIDENT REED: I believe the next paper is one the secretary has from Mr. A. H. Graves.

DISEASE RESISTANCE IN THE AMERICAN CHESTNUT**

ARTHUR H. GRAVES

(Read by the Secretary)

Your secretary, Mr. Bixby, has asked me to tell you about the native chestnut trees in the vicinity of New York City which I have found to be resistant to the destructive bark disease. I commenced the search for such trees in the summer of 1918, at the suggestion of Dr. Haven Metcalf, of the laboratory of Forest Pathology, Bureau of Plant Industry. During the campaign in Pennsylvania against the bark disease, scouts had been on the lookout for immune or resistant trees, but without result. As far as I am aware, no systematic organized search had been made for such individuals.

It was our plan to commence the search in the region of New York City, because this area is probably the oldest center of infection in the United States. Apparently this is the port of entry where the undesirable immigrants (Japanese or Chinese chestnuts) passed through quarantine and were allowed to disembark carrying their terrible scourge with them unnoticed. According to Metcalf and Collins,* this was probably as early as 1893. This was why we selected this area to begin on, for here the disease has had a longer opportunity to run its course than anywhere else, and, consequently, has had ample time

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* Metcalf, Haven & Collins, J. Franklin. The Control of the Chestnut Bark Disease. Farmer's Bulletin—467, 1911, P. 5.

** Illustration for this paper will be found opposite page 64.

(more than a quarter of a century) to call out the non-resistant trees. Those remaining, if any could be found, might be suspected, *a priori*, of being resistant.

As the work progressed, I soon realized that it would be most difficult, or perhaps impossible, to locate resistant or immune trees in a region not so long exposed to infection; for, in such a region, one would have to inoculate all individuals suspected of possessing resistant qualities, in order to ascertain whether their healthy condition was actually due to resistant qualities or simply the result of a chance escape of infection. We therefore decided to restrict the work, for the present at least, entirely to a definite area about New York City. This area includes all of the territory within a radius of about 16 miles from New York City Hall, and therefore comprised, in a general way, Greater New York and the adjacent parts of New Jersey.

RESULTS OF THE SURVEY

First I made a thorough canvas of Staten Island, doing the work on foot, aided by the trolley and the Staten Island R. R., and often guided by that genial naturalist and lover of Staten Island, Dr. Arthur Hollick of the Staten Island Institute of Arts and Sciences. I made a careful survey of the whole 64 square miles of which the island is composed. After two weeks of this kind of work, I began to get fairly well discouraged, not so much because of lack of results which, it is true, were entirely negative, but more on account of the appearance of the dead chestnuts. For where it was not entirely cut out, the bare, weathered poles showed that they had been dead for many years. The only encouraging feature was the finding of large quantities of healthy seedlings, from 7 years of age upward, to which I will refer later.

The Palisade region along the Hudson has been notable in the past for its chestnut forests. I next attacked this, making as thorough a search as possible from Hoboken to a little north of Alpine, N. J., which is a small place on the Hudson opposite Yonkers. Here also the vast forests of dead poles weathered gray with time, bore silent witness to the completeness of the destruction.

About the middle of July while ferrying across the Hudson, I noticed north of the landing at Dyckman St., what appeared to be chestnut trees in bloom. On investigation, I found these to be living native chestnuts, of the peculiar strip type I shall describe later, and proceeding further north from this, where the Harlem enters the Hudson, I was led into a forest where I found at least 40 living chestnuts, some of which were in good condition, and one particularly was leafy nearly to the top. (Fig. 1) Naturally, one would immediately suspect that somehow these trees had escaped infection, but this could not possibly be the case, for mixed in with them on all sides were bare, weathered trunks showing signs of old worn cankers, proving incontestibly that the fungus had been present here also for a long period. Shortly afterward, Dr. Olive, of the Brooklyn Botanic Garden, informed me that he had seen living chestnuts near Hollis, L. I., and at Valley Stream, L. I., and at each of these places I found a group similar to that near the Harlem.

These, in brief, are the high spots of the survey from the point of view of the scientist. In addition, I covered adjacent region of New Jersey to the west, including the Watchung Mt. range about Plainfield and the Oranges; the Bronx and Van Cortland Park and the country to Yonkers and the north, and to the northeast of New Rochelle. Long Island, as far as Hempstead, was also included. Altogether I travelled about 1200 miles on foot, not counting the distance traversed on trolleys and railroads. Always armed with opera glasses, I was careful not to use them when anyone was looking, for on the second day of the survey I had been arrested on the charge of being a German spy! I was also arrested on board a train in New Jersey for looking earnestly at a topographic map, then sharply out of the car window and noting what I had seen (dead chestnut trees) on said map. The carrying of a botanist's tin can (containing fungi, not bombs) was also an additional implicating circumstance on the latter occasion.

What then were the results of the survey? They may be stated briefly as follows:

1. No immune trees were found.
2. For the most part the older trees (from 20 years upward) were entirely dead, and had been so for a long period, as attested by the bare trunks, weathered a characteristic gray color which only time can produce.
3. However, large numbers of seedlings and young saplings were located, both healthy and diseased.
4. *The most important result was the finding of three well defined colonies of living mature trees; all of which, by virtue of characters to be presently described, are offering more or less resistance to the disease.*

SEEDLING TREES

It is well known that seedlings and young saplings are naturally immune for a certain period, which varies in extent from 8 to 15 years beyond germination of the seed beginning, of course with the first formation of the seedling. Such immunity depends, however, not on any inherent characteristic, but on the fact that at this period the bark is usually smooth, sound, and free from wounds of any sort where Endothia spores and mycelium might enter. Of course, when wounded from any cause whatever during this period of youth, this immunity ends, so that the condition might perhaps be termed physical, in contrast to physiological immunity.

As I have already said, large numbers of seedlings, for the most part still unattacked, were found in many places in the area surveyed. There are of course no grounds for believing that such seedlings, descended as they are from non-resistant trees, are physiologically immune. Where they are free from disease, this exemption is due merely to the physical immunity I have just mentioned. Since they therefore represent non-resistant stock, they were used for comparative inoculation work, which will be referred to later.

I may as well say here as anywhere, that by resistance, I do not mean total resistance, for that would be immunity. There are, of course, degrees of resistance, in the plant world just as in the animal world. One person may resist a cold germ or the influenza bacillus better than another, that is, it will cause him only a little discomfort. Another person may not be affected at all, that is, he is totally resistant or immune. I say this because I have misunderstood when I have used the term resistance. The trees in the New York region show all grades of resistance, from individuals where the fungus makes very little headway in the bark, to cases where it grows almost as fast as in the average non-resistant tree.

CHARACTERISTICS OF THE RESISTANT TREES

What now are the characteristics of these resistant trees? How are we going to know one when we see it? I have outlined the leading features as follows:

1. BARK. In the case of this particular disease, it is obvious that the character of the bark is the most important feature since this fungus is primarily parasitic in the living cortex. In other words, the character of resistance must necessarily depend on the living cells of the cortex. Now, careful observation of the resistant trees reveals a most striking feature of the bark, namely its tendney to heal, by means of a callus growth around the margins of the lesions, whether large or small; and it is very apparent that this callus growth wards off the advance of the fungus for a time at least. When the callus

growth is once formed, the fungus of the original canker encroaches on it very slowly, or often not at all. Inoculations in the callused margins of cankers showed usually only slight growth of the fungus after two months' time in the summer, or in some cases no growth at all. Several layers of wood could be counted underneath these callused margins—often 6 or 7—before reaching the annual ring exposed at the surface of the canker. This of course, shows unquestionably that the callus had remained healthy at that location for that period of time.

2. Extension of the Callus Tissue.—In many cases the callus tissue is of considerably greater extent than the normal area one would expect around a wound. It may even occur that the whole inner bark around the trunk is of a callused nature, without any open cankers showing at all. For example in a tree of which I have a photograph here (Figs. 2 and 4), the outer bark is sloughing off, revealing callused bark underneath of entirely different appearance, which no one would recognize as chestnut bark. This particular tree photopraphed represents an extreme in this respect. It seemed as if the whole tree was getting a new kind of bark, and yet this same character appears in all of the highly resistant trees. On cutting into this new callused inner bark it was found plentifully dotted with tiny *Endothia* lesions, which however, never penetrated deeply. (Fig 4). Close to the cambium the white inner bark is quite healthy, generally for a thickness of 5-7 mm. That the mycelium in the small lesions was unquestionably the *Endothia* mycelium, was shown by the appearance of the mycelium, and the presence of the *Endothia* pustules in many of the spots. That these were not late infections, but only slowly growing small lesions, was shown by inoculations in such bark, which revealed scarcely any growth after two months.

3. The White Secretion.—The most striking peculiarity of the callus tissue, is its abundant content of a thickish, milky,white substance. This came to light immediately when I cut into the callus, and it showed up very clearly when I shaved off the outer layers of dead cork tissue. The white material is not evenly distributed through the irregular grain of the wound tissue, but is particularly abundant in small spots or pockets which are especially conspicuous in the callused margin of the lesion. Soon after exposure to the air, the cut bark, and particularly the white substance, redden rapidly, indicating oxidation. This peculiarity is of course true of all chestnut bark, yet here the reddening seems to be deeper and more rapid than the normal. No chemical analysis has yet been made of this substance, but there is suffi-

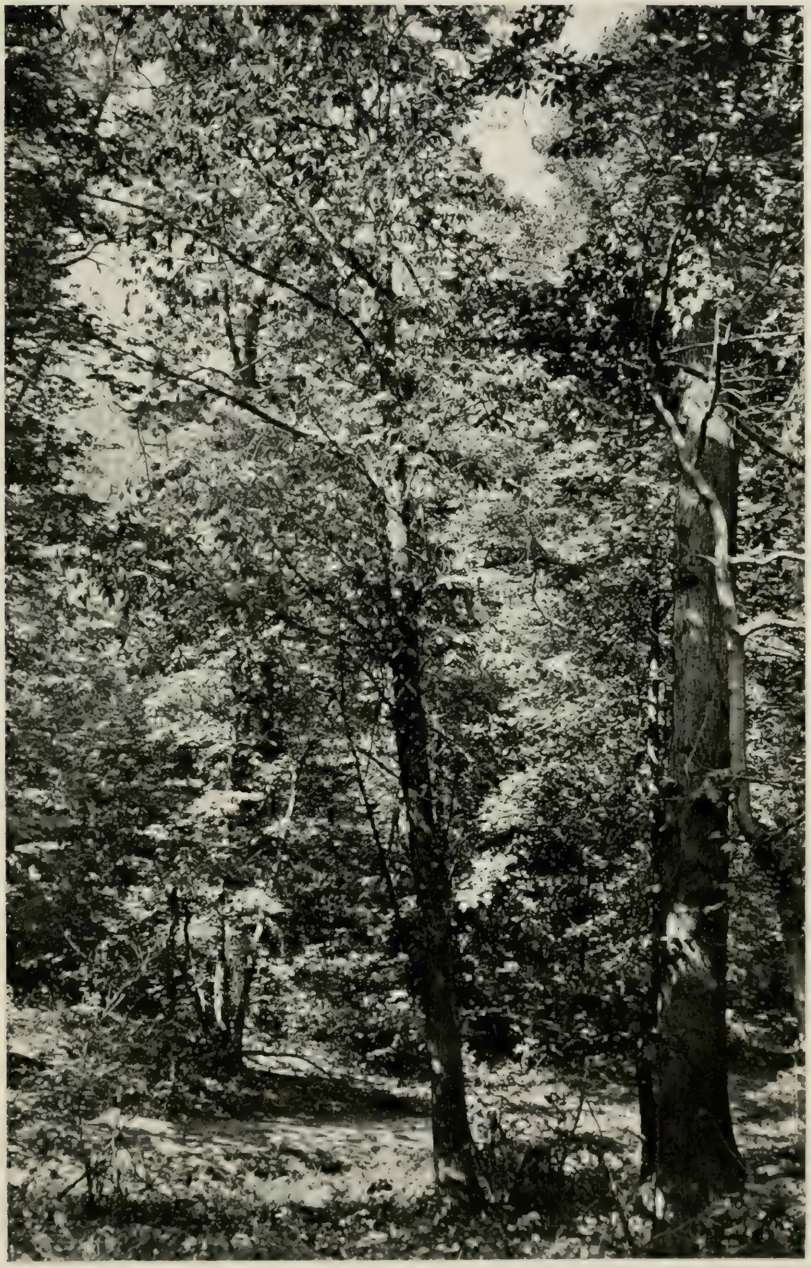

FIG. 1

One of the most resistant trees, the smaller tree near the center of the photograph, near the Harlem River, Boro of Manhattan, New York City.

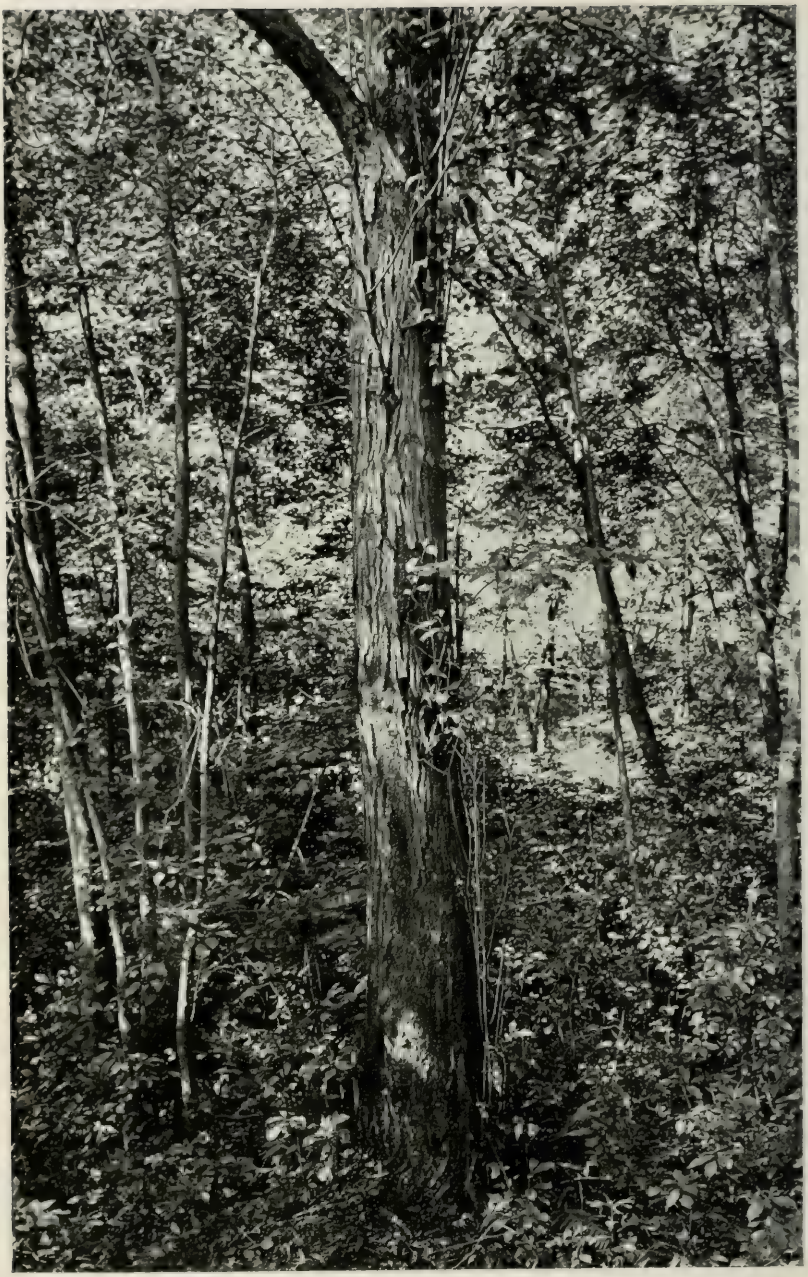

FIG. 2

A very strikingly resistant tree at Valley Stream, Long Island, showing peculiar inner bark. The outer bark is sloughing off.

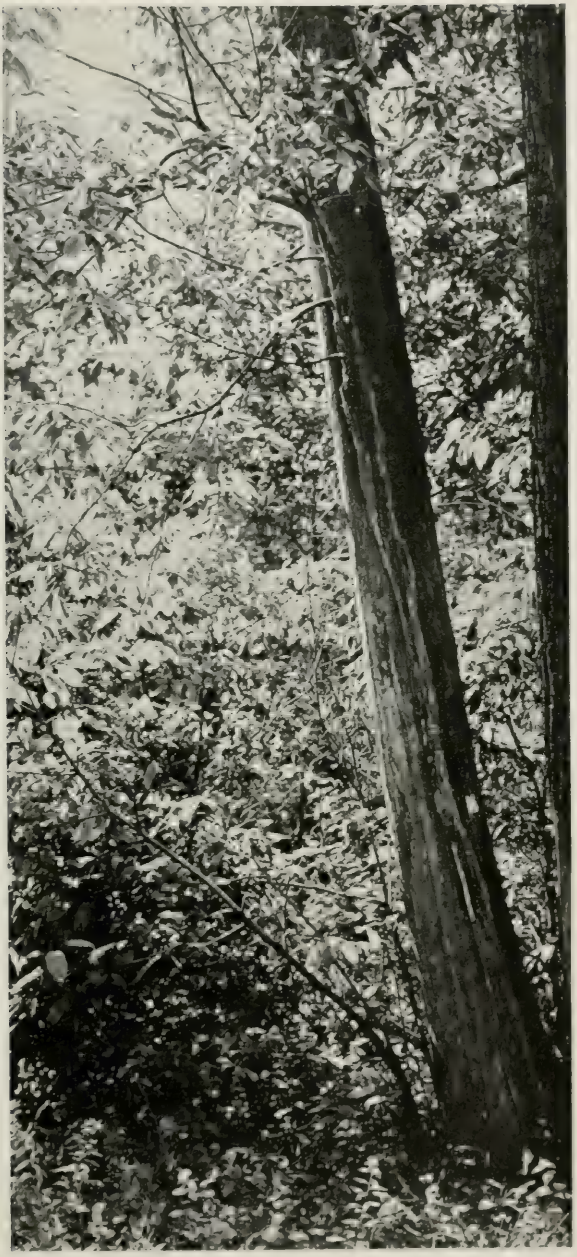

FIG. 3

One of the "strip" trees in the forest in the Boro of Manhattan, New York City.

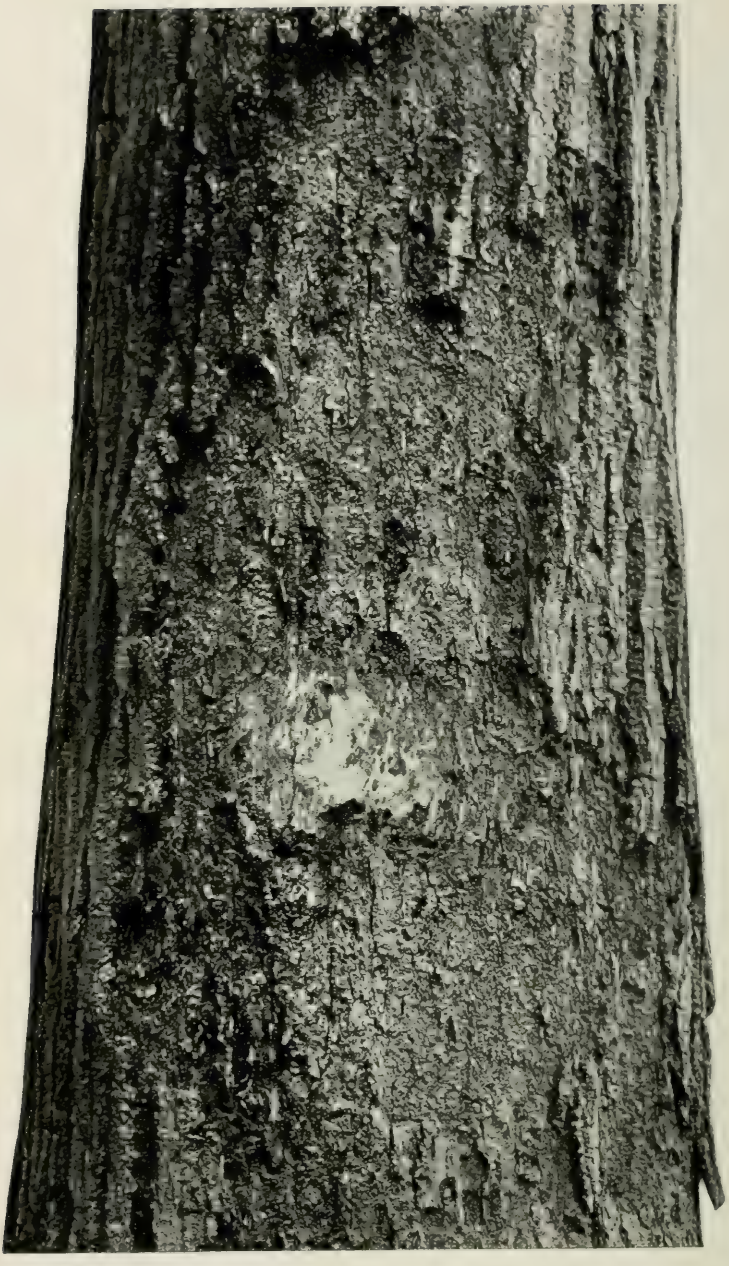

FIG. 4

Showing the character of the inner bark of the Valley Stream tree (Fig. 2). At one place, near the center of the photograph, the bark has been shaved showing the small lesions caused by the fungus.

cient other evidence at hand to warrant a tentative statement that it is very rich in tannin or tannin compounds, and that possibly the quality of resistance is bound up with the nature of this material.

4. THE STRIP CONDITION.—Some of the trees showed the living bark restricted to a narrow, flattened, rope-like strip running up the trunk to one or a very few branches (Plate 1, Fig. 3). In these cases all of the bark was of the callus nature, rich in the resistant substance, and plentifully besprinkled with small Endothia lesions, while underneath were a number of layers of functioning wood. The rest of the trunk was bare, weathered gray, with traces on its surface of old cankers, and evidently dead for a long period. This type of tree was so commonly found that I have called it the strip tree.

INOCULATIONS

The very fact that these trees are now alive in this New York region is pretty good proof of their resistance. But of course the most conclusive test is by inoculation with the fungus in question. If the fungus grows slowly in these trees as compared with its growth on non-resistant stock, then no one can deny that they are resistant. I will not bore you with figures of tables, I will only give you the results. The average growth of the fungus in 289 inoculations on the resistant trees was about 1-3 as fast as on non-resistant stock, and taking the rate of growth on those trees which are especially resistant it is about 1-4 as fast as on the non-resistant stock. For non-resistant stock the seedlings on Staten Island were inoculated, and the growth on these tallied very closely with growth in non-resistant trees inoculated by Anderson and Rankin.*

Another very striking result brought out by the inoculation work was that of the 158 inoculations on branches and basal shoots of the resistant trees, only nine had been girdled after one month's growth, while in the same time 16 out of the 32 non-resistant Staten Island trees were girdled. At the end of the second month, the results were still more striking. Then, in the Staten Island trees, 22 out of 32 were girdled, while in the inoculations on the basal shoots and branches of resistant stock only 22 out of the 153 resulted in girdling. This striking difference was not due to smaller diameters of the Staten Island trees, for particular pains were taken to have them approximately equal to the branches and shoots inoculated in the resistant trees.

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* Anderson, P. J. & Rankin, W. H., Endothia canker of chestnut. Cornell Univ. Agri. Expt. Sta. Bulletin 347, 1914.

SUMMARY OF EVIDENCES OF RESISTANCE

We may summarize the evidences of resistance as follows:

1. The results of the inoculation tests show that the fungus grows in these trees on the average from 1/4 to 1/3 as fast as in ordinary chestnut.

2. The occurrence of the trees in a neighborhood long subjected to the disease, and their presence among the trees of individuals long since dead.

3. Indications of the long period the disease has been present in the trees themselves: such as bare weathered tops, and healed cankers.

4. Peculiarities of the bark; such as extensive development of the callus tissue, and the presence of a peculiar substance or white secretion which is particularly conspicuous in cases of marked resistance.

IS THE DISEASE RESISTANCE HERE AN HEREDITARY CHARACTER?

As to whether this disease resistance is an inherent character and will be transmitted from generation to generation, or is only the result of particularly favorable environmental conditions such as soil, light or moisture, is a point of great practical importance. I believe that further work will prove that the resistance is heritable, for the following reasons:

1. The resistance is not due to a particularly favorable environment of the trees, for the three groups grow in very different soils and under varying conditions of light and moisture.

2. The finding of the trees in colonies points to a genetic variation. At first I was unable to account for the grouping of the trees, for I had expected to find immune or resistant trees singly, here and there. But if we adopt the hypothesis of a heritable protoplasmic variation—something in their "blood," so to speak, the explanation is easy. We know that chestnut fruits or nuts do not travel far, like the seeds of willow, poplar, maple or ash, and therefore, in any given stand of chestnut, if we could go back from generation to generation into earlier time, most probably the majority of the trees would be found to have arisen from a common ancestor, although of course a few outsiders would have found their way into the group, carried by squirrels or other animals.

3. In a considerable number of cases all the members of the same group of coppice trunks from an old stump show a similar degree of resistance. To attribute such a condition as due merely to chance, occurring as often as it does, would be placing a pretty large burden on chance; and since the coppice trunks are all off-shoots of the same

plant. the condition is what one would expect were the resistant quality in inherent character. A correspondence of degree of resistance was also noted, in the inoculations made on branches, trunk, and basal shoots of the same individual tree.

Experimental work is being carried on at Washington to test out the truth of this hypothesis, i. e. to see whether or not the disease resistance is really heritable. The work is being carried on in connection with the propagation of other resistant stock, Chinese, Japanese, etc., and, as soon as the department is sure of the product, the results will be distributed to nut growers and others who are interested.

In the meantime we can all help by being on the lookout for resistant native trees. I believe they will be found in many places besides the New York region.

EVENING SESSION

SANITARIUM GYMNASIUM, AT 8:00 P. M.

President Reed in Chair

DR. J. H. KELLOGG: Ladies and Gentlemen: Battle Creek has the honor today and tomorrow to entertain the Northern Nut Growers' Association. This association with other associations having similar purposes, is undertaking to do, it seems to me, one of the most important things that can be done for the American people—to show us how we can get our nitrogen, our protein, and our fats without the livestock industry which is wasting at least nine-tenths of the grain, or in fact at least nineteen-twentieths of all our foodstuffs. The great cause of the high cost of living at the present time is that the pigs and the cattle are eating up our corn and other good things that we ought to eat ourselves. If we had a sufficient area of land, perhaps even the sides of our roadways and railways planted out to black walnuts and other good nut trees, we would have all the protein and fat we needed, perhaps as much as we are getting now, and more, and the cattle industry might be entirely dismissed from consideration, and a great deal of labor would be saved. I am sure that there is no place in the whole United States where this Association could have a heartier welcome than here in Battle Creek, or where people could be found who would appreciate its labors any more. You are going to have a very interesting program tonight. We are favored with visits from very distinguished gentlemen from all over the United States, among others Dr. Robert T. Morris, the nestor of American surgeons has come all the way from New York to tell us about some wonderful discoveries he has made, and a fatherless walnut tree he is cultivating, and other things that will be of great interest to us all I am sure. I take pleasure in introducing to you the president of this Association, Mr. W. C. Reed, of Vincennes, Indiana. Mr. Reed.

PRESIDENT REED: We are simply continuing our program. This afternoon we were in session at the Annex and moved over here this evening so as to be able to present what we have here so we could entertain more of you than we could over there to advantage. You know that most all men have a hobby along some line or other, and those who constitute our leaders, whom we have to look to, and along the line of nut trees of different species and so on, we have learned to look to Dr. Morris as one of the leaders. I have great pleasure in introducing to you Dr. Robert T. Morris, of New York, who will address you on the hickory.

NOTES ON THE HICKORIES

ROBERT T. MORRIS, M. D., NEW YORK CITY, N. Y.

When people speak of the "hickory" without qualification, they are apt to have in mind some one kind of hickory which belonged to their boyhood environment. All other kinds which they happened to know, were qualified in some way, very much as the word "fish" in Boston stands for the codfish only, other kinds of fish in the world being described by qualifying names. In the northeast the hickory means the shagbark. In Missouri it means the shellbark. Elsewhere the pignut and the mockernut are called "hickory." Interest in the subject has increased so rapidly of late years that we must all of us be more particular in our descriptions and add qualifying names, speaking always of the shagbark hickory, pecan hickory, or bitternut hickory as the case may be. Sargent describes fifteen species of hickory and in addition a large number of varieties by environment and by hybridization. There is a Mexican hickory, making sixteen species for the North American continent, and the late Mr. F. N. Meyer, Agricultural Explorer from Washington, has found a hickory in China. Previous to this discovery, it was believed that the hickories belonged to the North American continent only.

Botanists divide the hickories into two groups, Apocarya and

Eucarya. For convenience in every day conversation, it might be well for us to speak of the "open-bud" group and the "closed bud" group. *Apocarya* or the "open bud" group, includes the pecan hickory, *Carya pecan,* the bitternut hickory, *Carya cordiformis,* the bitter pecan, *Carya texana,* the water hickory, *Carya aquatica,* the nutmeg hickory, *Carya myristicaeformis,* and the Chinese hickory, *Carya cathayensis.* The winter buds of this group will be seen on examination to show the minute, snugly curled-up leaves which are ready to burst forth when the springtime sun opens the fronds of the ferns which have forced their way through the hard ground with clenched fists. The scale buds in the open-bud group do not cover the tiny leaf forms completely.

In *Eucarya,* or the "closed-bud" group, stout scales close the bud completely against the snow and ice of wintry days, so that we see scales only when looking at the bud. The closed-bud hickories include the shagbark, *Carya ovata,* the Carolina hickory, *Carya Carolinae-septentrionalis,* the shellbark, *Carya laciniosa,* the mockernut, *Carya alba,* the smooth-bark hickory, *Carya leiodermis,* the pallid hickory, *Carya pallida,* the close-bark *pignut, Carya glabra,* the loose-bark pignut, *Carya ovalis,* the Florida hickory, *Carya Floridana,* the Buckley hickory, *Carya Buckleyi,* and the Mexican hickory, *Carya Mexicana.*

Hickories which have nuts with a bitter pellicle, all belong to the open-bud group. These are the bitternut, Texas hickory, and water hickory. Hickories with scaly bark are found in both groups. In the open-bud group, the trunk of the water hickory carries long loose bark strips attached by one end, and in the closed-bud group, we find this characteristic belonging to the shagbark, shellbark, Carolina hickory, and to one of the pignuts, Carya ovalis. That takes us to another occasion for a note. What do we mean by "pignut?" In the North, this term is applied to Carya glabra and Carya ovalis. In the South, it is applied to Carya cordiformis. A name so well established, will have to be retained, but in our Association it will perhaps be best to have an understanding about which one of the hickories the common name pignut should belong. So long as it already covers two species in the North as opposed to one in the South, there are already two votes to one in favor of retaining the name pignut for Carya glabra and Carya ovalis. We may describe these in plain language as the smooth-bark pignut and the loose-bark pignut. The reason for choosing the name "loose" instead of "scaly" is because we are pretty well agreed upon applying the name "scalybark" to the Carolina hickory, the name "shagbark" to Carya ovata, and the name shellbark to Carya laciniosa. The name bitternut may safely be allowed to remain with Carya cordiformis because the other two nuts with bitter pellicle already have distinctive names, Carya aquatica being called water hickory and Carya texana being called bitter pecan. By making fixed points in nomenclature in this way we may head off the confusion which will become worse confounded as the interest in hickories becomes rapidly enlarged, if our committee on nomenclature does not take some decisive step.

Concerning Latin nomenclature, we have further troubles for settlement. Hicoria is the oldest generic name and naturally should have priority but the Vienna Congress of Botanists adopted Carya. So far so good (or bad). Now comes our trouble in giving specific and varietal names. The binomial is clearly applicable enough for species, Carya pecan, for example, but when we come to varieties of the pecan there are two kinds of varieties to be considered, those by environment and those by hybridization. In cases of natural variation we are still within accepted resources in nomenclature by saying for example, Carya pecan, var. Stuartii. When naming hybrid varieties, however, I would suggest that in advance of the abbreviation "var", we place the abbreviation "hyb." thus reading for Brown's pecan, "Carya pecan, hyb. var. Brownii," instead of "Carya Brownii," which latter binomial would throw it among the species. In view of the fact that we are to have in the future hundreds of named hybrids, it seems to me that we must adopt some such definite method for convenience promptly. This method of naming, relates to convenience and is applied to the most evident parent. As a matter of fact, in horicultural circles we are doing precisely that sort of thing, speaking, for example, of "Brown's pecan" meaning a nut which we recognize as being a hybrid, brought to attention by Brown but with the pecan as parent most strongly in evidence.

When I was a boy, the only hickory nuts of any sort available, were those collected from wild trees. The popular boy was one who knew of some trees which furnished the best nuts and who did not keep the news to himself. The squirrels knew the best nuts as well as the boys did and they would go past many hickory trees along fences and groves in order to congregate in the ones which had the nuts with the thinnest shells and plumpest meats of best quality. In the early morning hours I have seen several squirrels in one particularly good hickory nut tree and not a single squirrel in a tree completely filled with nuts, though its branches touches those of the first one. Men are quite as intelligent as squirrels in some respects. Here and there attempts were made at propagating fine hickory trees of various species by planting nuts. It was not generally known at that time that the hickories were so thoroughly crossed like the apples, that they would not reproduce true to type from seed. Attempts were then made at grafting which were mostly failures for many years. We are now on the verge of a great development in hybridization or crossing of choice kinds of hickories and in determining upon which stocks the different kinds of selected hickories may be grown to best advantage. Hybrids between varieties of hickories occur frequently in nature and hybrids between species of hickories occur occasionally. A number of these accidental hybrids have been discovered and some of them are now being propagated. For the most part they do not represent the best quality of the best parent but it is a notable fact that the bitterness of kinds with the bitter pellicle appears to be a recessive character and disappears usually from hybrids between species in which one parent has a bitter nut. Unfortunately, the finer extractive which give character to the nut of the better parent are prone to disappear also. This is in line with our experience in mixing of characters along Mendelian lines. Given a sufficient number of hybrids and we shall have here and there one with spectacular characteristics of special value.

Now that horticulturists at the present moment are turning so freely toward the idea of producing quantities of hybrids artificially, the next generation will see hickory nuts which were not dreamed of in the days when I was a boy. The crossing of hickories is not difficult work. We simply remove the male flowers from branches carrying female flowers before the male flowers have begun to shed their pollen. The female flowers are then covered with oiled paper bags tied over them for protection and when the danger from self pollination has passed, we take off the bags and add a little pollen which we have kept for the purpose—pollen from some trees bearing remarkably valuable nuts.

Nuts resulting from this cross pollination when planted, give us new varieties of trees which never have been seen before by anybody and that is so interesting that very many people will probably take up hybridization as an incident in recreation. Some of the hybrids will bear very early in their history and others very late. If one is impatient to determine at once which ones are to be valuable, he can hurry the process by grafting a number of cuttings from young seedling trees into the tops of larger trees which are already bearing labeling each graft, so that he may keep track of the seedling stock from which it came. It is possible to put one hundred or more seedlings in the top of some stock tree at one time.

One reason for delay in propagation by grafting is because the hickories like many other trees are slow in making repair of wounds. Grafts usually perished before being accepted by the stock under grafting methods that were in common use. The best step forward in grafting method for hickories is one that I obtained from Mr. J. F. Jones, Lancaster, Pennsylvania. He tells me that he obtained the method from its originator, Mr. E. A. Riehl, Godfrey, Illinois. This consisted in covering the entire graft, buds and all, with melted grafting wax and including also all of the wound and wrapping of the stock. The buds make their way through this grafting wax without any difficulty, but the grafting wax used by Mr. Jones contained lamp black and that used by Mr. Riehl consisted of a beeswax and rosin mixture. It was found that these seemed to be applicable in the North but not farther south in the hotter sun. Examining into the reasons for this, it seemed to me that in all probability the black grafting wax used by Mr. Jones and the brown or amber grafting wax used by Mr. Riehl, would naturally allow the heat rays of the sun to pass through to the graft while halting the actinic ray of light. The latter is extremely valuable for promoting the activity of chlorophyl, which acts only in the presence of light and in the best way in the best light. The heat rays might have certain destructive qualities. With this theoretical idea of the situation in mind, I employed melted paraffin in place of the grafting wax, covering the scions completely as well as the wound in the stock and the wrappings. This immediaitely proved to be a success. In fact, it appears to have changed the entire subject of grafting nut trees in such a way that any intelligent boy employing this method can now do better hickory nut grafting than would have been possible at the hands of an expert two years ago. The melted paraffin fills the interstices in which sap might collect and ferment, but at the same time, hardening so quickly that it does not introduce the danger of extension between points of contact with scion and stock. The second point of value consists in allowing the actinic ray in the sunlight to act upon the chlorophyl in bud and bark of the scion and it does not attract the destructive heat ray. This is perhaps the most important single point of value and due to the transparency of the paraffin. Third, the paraffin coating, impervious to air, maintains the sap tension equally in the course of fluctuation between negative and positive pressures occurring between night and day, and under varying conditions of light and temperature. This maintenance of equalized sap tension, I believe to be important. The paraffin is waterproof and prevents evaporation from the scion, which otherwise is prone to dry out before granulation of the wound has taken place in the hickories, as in other species which callus slowly. Fifth, under the paraffin coating of stock and scion, the plant apparently does not have that anxiety which would otherwise lead it to introduce the protective feature of superization, the spreading of a corky layer over the wound surface between stock and scion, thus introducing a mechanical obstacle to union.

This method of grafting has extended the grafting season for nearly two months, apparently. Formerly, I hurried to get all of the grafts in while buds were bursting, in early May. During the season of 1919 I grafted hickories up to August sixth experimentally. The last grafts which caught well in a practical way were put in on July twenty-first. After that the proportion of catches was small and the growth feeble. Incidentally, it may be remarked that filberts grafted as late as August sixth, did perfectly well. The scions employed were cut in late winter and kept in the sawdust of my icehouse. I formerly supposed that ice beneath the sawdust was important, but this year I could not get ice and the scions kept just as well. In July, experiments were tried with grafting directly from one tree to another, using wood of the season's growth. This worked well with hazels, but not with hickories or walnuts, only one out of many hickory grafts catching. That one, however, is significant and I hope to work out principles which will allow of direct grafting of hickories as readily as may be done with the hazels.

When a hickory graft is to be inserted into a small stock or branch, the ordinary cleft graft does well. In stock recipients much larger than the graft a side cleft of the width of the scion only is desirable, or better yet the "split bark" method devised by Mr. E. A. Riehl. A straight split is made in the bark of the end of the stock, and the graft crowded down into this split so that it remains between bark and wood finally. My own method for large stocks, is what I have called "the slot bark method." This consists in turning down a width of stock bark measuring the same as the scion in width. When the scion has been inserted into this slot so made, the bark is turned up over it again and fastened there. By this method I have put scions in the trunks of trees nearly a foot in diameter and at any chosen point, sometimes several feet below the ends of cut branches. One may cut off the top of a large hickory tree and then peg the trunk full of scions by means of bark slots.

Another important point in hickory propagation work consists in the employment of the Spanish windlass for fastening graft and stock together. The old time wrapping of twine or of raffia had to be released in order to allow growth at the point of union of scion and stock. When cord is used it cuts deeply into the new growth, and raffia, which is placed on flat, will be burst open. In either case new wrapping is required at a precarious time, according to old methods. The Spanish windlass, which is used in surgery for controlling haemorrage, seemed to me to be applicable for fastening scions in place. It consists in a paraffined cord with ends tied in a firm knot but hanging loosely about the graft and wound. A wooden skewer or any small lever, is then inserted into the loose loop of cord and twisted about until the part of the cord about the graft wound is so snug that it holds the scion in place more firmly than it can be held by any other sort of wrapping. In order to prevent the cord from cutting into the bark, two shields of wood or metal an inch in length, are interposed between cord and bark. The lever of the Spanish windlass is fastened with a cord or with a galvanized nail in order to prevent the windlass from unwinding and the whole covered with melted paraffin. This may remain in place for two seasons without change, holding the scion firmly in place all of that time and requiring no attention. The growing stock separates the two shields very much as it might separate two stones in the field and automatically unwinds the Spanish windlass by sheer force, just enough to allow growth without any unloosening of its holding apparatus.

In hickory grafting, much experimental work remains to be done in the choice of stocks for grafts of different species. Almost all of the hickories that have been grafted upon the pecan hickory stock, seem to do pretty well upon that stock, but the converse is not true. The pecan apparently does not do well as a rule when grafted upon other hickory stocks, even upon those of its cousins in the open-bud group. The shagbark hickory, in my experience, has done best upon stocks of the shagbark or mockernut or pignut. A number of years, however, are required in some cases for determining that point. Shagbarks which I have grafted upon bitternuts have sometimes made a remarkably good start. Then at the end of three or four years they begin to slow up, while shagbarks on shagbark stock, starting slowly at first, surpassed the ones on bitternut stock finally.

In the spring of 1919, I topworked two trees standing near together and of about the same size (thirty feet) with Beaver hybrid (a cross between the bitternut and the shagbark). One of the trees was a bitternut and the other a pignut. Almost everyone of the grafts of the Beaver grew thriftily on the bitternut. Those on the pignut stock practically all caught and made short growth and then began to wilt back. Finally, only one shoot remained alive. This very striking object lesson will have bearing in varying degrees in all of our hickory grafting. According to my experience to date, hybrid hickories are grafted more readily than are straight species or varieties. They seem to have lost family pride and seem to take up with any friend offering economic support. In the case just quoted, however, caprice was shown by the Beaver hybrid which took eagerly to a host of the species of one of its parents. It refused to thrive on the pignut which did not represent either one of its parents although that same pignut stock would have been accepted by shagbark scions—the shagbark representing the other parent of the Beaver. This sort of experience throws open the entire subject in such a large way as to show what possibilities of success and failure lie before us in experimental work. The same method of grafting, the paraffin windlass method, was employed for these two trees which were neighbors.

Interesting experimental work is to be done in finding the extent to which different species and varieties of hickories may be grown out of their indigenous range. At Stamford, the bitter pecan from Texas, appears to be perfectly hardy but it makes very slow growth—sometimes less than an inch in a year. The Buckley hickory also from Texas, grows thriftly at Stamford and so does the Carolina hickory. Pecans from the northern belt thrive at Merribrooke, but those from the southern belt have such a long growing season, that their new wood is not yet sufficiently well lignified to stand the winter well. Some of them pull through a mild winter in fairly good order, but on the whole they do not thrive.

The commercial side of hickory raising, is being worked out for the pecan only at the present time. We may assume that several of the other species of hickory adapted to growing in the north, will equal pecans in importance, eventually. The reason for that is because some of the other hickories stand quite as high as the pecan in food value and general excellence. At the time of writing, low grade seedling shellbark nuts from the West are selling in the retail market in New York for forty cents a pound. I have seen better nuts of this species being loaded on the cars in Ohio at fifty cents a bushel. The present New York price, to be sure, represents a profiteering war price. Fine grades of shagbark hickories and some of the hybrids will command prices equally high with prices for best pecans in the market of tomorrow.

Voice: Will it be practical to plant nuts, get young plants, and then bud or graft them?

Dr. Morris: Yes, that is what we do. It is practical to plant nuts for the purpose of getting a stock, but not for the purpose of getting nuts. But we plant them in the nursery rows, and then when they are two years old, preferably (some like three-year-old trees), we graft them over to good kinds in the nursery row; then they remain there for a year or two, and are transferred or sold. We now have members of this association who are experts in grafting nut trees who make that a business. It is not generally known that we have in this country three journals devoted wholly to the subject of nut culture. We have nurserymen who make a specialty of grafted nut trees of the very best sorts, so that one may perhaps take up this mode of farming more profitably today than almost any other sort of farming. One gentleman in Pennsylvania told me he made thirty thousand dollars on one crop of chestnuts two years ago, cultivated chestnuts. He had thirty acres, and no tree was yet fourteen years of age. His net profit beyond all expenses was thirty thousand dollars that year. There are probably very few professional men who make more than that a year. Many men are making good, comfortable incomes out of their nut orchards. It is the best insurance against the needs of old age, the best sort of life insurance.

Voice: Do you use anything besides the hickory as stock for grafting on?

Dr. Morris: Yes, we have some experimenting to do in order to learn which stock will best serve for a certain variety. We find that one species or variety of hickory will accept other varieties of that species well, but perhaps it will not accept another species. We do know that certain kinds do remarkably well on certain stocks; but the entire range of that subject has not as yet been worked out.

Question: Does the stock you graft on have any effect on the quality of the fruit?

Dr. Morris: The stock on which you graft is supposed to have no effect at all on the quality of the fruit. But there are some exceptions. We learned that in orange grafting. A naval orange grafted on the wild orange stock might be raggy, not full of juice; while when grafted on the trifoliate orange stock might be heavy and full of juice. So in that case the stock did have some influence upon the graft; and there are other instances. But as a rule we assume that the stock has no influence upon the graft in regard to the validity of character.

Question: Are pecans a variety of hickory?

Dr. Morris: Yes, pecans are hickories. The Indians gave it the name of pekan. The French spelled it pecanne, so that has been spelled as the pecan, without the necessary other part of its name, hickory. We should always say pecan hickory—always.

Dr. Kellogg: Dr. Morris, how old hickories may be used for grafting?

Dr. Morris: I have experimented with trees up to fifty years of age; but the most satisfactory work, perhaps, is done with trees that are not more than fifteen or twenty years of age and three or four or five inches in diameter. Those are the best trees to work with. If we cut off the limbs of a very old tree and try to top work it, it means an enormous amount of work on the part of the orchardist, more work than my employees like to give it. But one may topwork a tree of almost any age, preferably a tree less than twenty-five years of age; and by choice I should say trees not more than ten years of age. We have experts in the audience better qualified to speak on that subject than I am.

Question: Do you prefer the melted paraffin to the old-fashioned way of using bees wax?

Dr. Morris: The old-fashioned beeswax had a certain color, and the black wax with charcoal, with lampblack, both turned the light ray and allowed the heat ray to enter so that the amber of the old resin wax, and the black of the black wax both allowed damage to occur to the tree, in the South particularly, in a hot climate early in the summer, prevented our grafting in the summer because of the turning away of the light ray that was wanted and the absorption of the heat ray that was not wanted. The melted paraffin being perfectly transparent, allows the light ray to set the chlorophyl into activity. All the life processes of the tree are carried on under the influence of the green chlorophyl grains, and these work only in the presence of light.

Question: Can you successfully graft a pecan on the pignut?

Dr. Morris: Not very well. They will grow pretty well for three or four years, but at the end of that time the union is not quite good. They do not bear very well. Has that ever been done successfully, Mr. Reed?

President Reed: I think not. At the end of three or four years they go back.

Dr. Morris: Have you known of any such case, Mr. Jones?

Mr. Jones: I have known of one case in six.

Dr. Morris: They live, but it is like grafting roses on an apple tree.

Question: What is the best thing to graft on the pignut?

Dr. Morris: The shagbark grows pretty well on the pignut. You can also graft the king nut or the shellbark. So will the Carolina hickory. You have at least three first rate hickories that will grow on your pignut.

Question: What is the best stock to graft pecan on?

Dr. Morris: Pecan stock, I think. I do not think we have anything better. Mr. Reed and Mr. Jones are both experts in that field. They have grafted hundreds of thousands of trees.

President Reed: I think the pecan is the best. The hickory will grow on the pecan very well, the shagbark hickory, but it will not do to change it with any degree of success.

Dr. Morris: The shagbarks will grow fairly well on pecans, but the pecan not well on the shagbark. It is best I think to put shagbarks on shagbark or shellbark. But they do well on pignut. I have got some very good shagbarks on mockernut. On bitternut they grow fast, but at the end of eight or ten years are inclined to slow up. Shagbark can be put on, I suppose, ten other kinds of hickory, but the pecan can not.

Question: How many grafts would be necessary on a nut tree twelve inches in diameter?

Dr. Morris: I should say you would probably have to put in fifty. I would cut off the branches down to about two inches or an inch and a half in diameter, and that might leave fifty stubs to graft. Graft all of them, is one way to do it. Having done one that way, you will then become familiar with the entire subject.

Question: What is the best time of year?

Dr. Morris: I don't know. Some time ago the American Agriculturist said to its readers that there is disagreement about the best time for pruning peach trees. Let us hear from all our readers. So all of the readers wrote expressing their opinions, and the editor said, "Summing up all of the opinions, the entire testimony in the case, we have decided that the time to prune your peach tree is when your knife is sharp." I had always supposed that the best time for grafting was when the buds were first bursting in the spring, always held rigidly to that, and at that time of the year was in a great hurry. I dropped professional work and lost hundreds and even thousands of dollars in order to see this work go ahead; it is more interesting than professional work. And now this year, with this new method, I have grafted right straight on up to the first of August, and everything growing—deliberately, all through the summer. So that now, at the present moment I do not know. A year ago I could have told you. When I first graduated in medicine, I could answer any question in medicine. After forty years of surgery, I am puzzled over a great many questions. It is the same way regarding grafting.

QUESTION: In summer grafting do you remove the leaves from scions?

DR. MORRIS: In summer grafting I have used for the most part scions I have kept in the icebox in sawdust. I have formerly put in twenty or thirty tons in my icehouse for my family to use during the summer. Last winter we could not get any ice, and my scions were just as good kept in the sawdust as if we had had ice; and I grafted those scions in August and the grafts are living. I have also cut off the leaves in grafting, but that is new and you can not depend on it—stop at one tree, cut off a piece of it, and put it on another tree and have it grow. I have never done that until this year, and it does not succeed in a very large percentage. It is not practical. It can be done—I have proven that; but it is not practical. The best way is to use your scions from last year that have been kept in cold storage in sawdust or leaves.

DR. KELLOGG: When should the scions be cut?

DR. MORRIS: There is some disagreement about that. Almost all scions may suffer a little winter injury. Some men prefer to cut in the early part of December before we have had any hard winter, then keep them in cold storage during the entire year, moderately moist, or protected in sand, leaves, or stratification. But I have always preferred February myself, cutting them the last of February before the buds begin to start, then put them in sawdust in the icehouse or cold storage, or bury them under a thick layer of leaves. For budding you transfer immediately. In fact, budding technically comes under the same physiologic principles as grafting. In budding I do that work in my place at Stamford, Conn., about the latter part of July or early August.

Dr. Kellogg: Do you use the same method in transferring buds?

Dr. Morris: Yes, I fix them the same way as I do the graft and cover everything with paraffin. I have even had a little short side graft grow using this paraffin method, a graft two or three inches long.

Dr. Kellogg: Tell us about those fatherless walnuts.

Dr. Morris: In the course of crossing the nut trees, we supposed, as a matter of course, that we must always have the pollen from one tree, or from a tree which bore the staminate or fertilizing flowers, in order to develop nuts or fruit of any sort; but on one occasion I covered a lot of Chinkapin female flowers with paper bags; I didn't have pollen enough to go around and left the bags on because I happened to be too lazy or too busy to pull them off. About a month later when I did take them off I found a full set of chinkapin nuts under those bags. They had received no pollen. That was an observation of a good deal of interest. It may have been that they had gone on by what we call parthenogenesis, and we had the children without the father, had the female parent only, the fatherless chinkapin. It sounds sad. I followed up the experiment with other nut trees, and found that not infrequently we may develop fatherless nuts. The effect will be, according to natural law, to intensify the characteristics of one parent. The female which bears this fruit, this child, without a father, will give to that child an intensification of her own characteristics. That will be the effect of parthenogenesis. That may be continued through several generations perhaps; we do not know. It is new, quite new. (Applause).

President Reed: The next topic is the Digestibility of Nuts, by Mr. Cajorie, of Yale University.

THE NUTRITIVE VALUE OF NUTS

F. A. Cajorie, Yale University, New Haven, Conn.

Mr. President and members of the Northern Nut Growers' Association: It was with great pleasure that I accepted the invitation of your Association to be present at this convention and give a discussion of nuts and nut production, from the point of view of their nutritive or food value. During the last few years our knowledge of nutrition and the parts that individual foods may play in the diet has been greatly increased and in the light of the new discoveries, it is interesting and valuable to view the place that nuts hold.

As you are well aware, nuts have been used as foods by the peoples of the world. In many places nut products have made up a very appreciable part of the diet. Chestnut flour is extensively used in Southern Europe. Among the peasants of Tuscany, chestnut flour forms a considerable part of the total diet. In this region, also ground acorns are made into bread with cereal flours and in this form is a common food. The hazel or filbert nut is also seen in the form of flour on the shores of the Black Sea. Races living in the tropics have utilized the many varieties of nuts indigenous to tropical climes such as the coconut, Brazil nuts, Java almond, Paradise nut, candle nut and African cream nut. In the Orient, the lichi, ginko and water chestnut, and in Italy and India the varieties of the pine nut are used to considerable extent.

In America, with the exception of a few localities and among a limited class of people, nuts have never made up a staple part of our dietaries, rather they have been used as tasty supplements to otherwise complete menus. That they are prized as adjuncts and are sought after is strikingly shown when we see in our markets not only the products of our native American nut trees, the hickory, walnut, butternut, chestnut, pecan, beechnut and pinion, but the Brazil nut, filbert, English walnut, peanut, coconut, all of which are derived from foreign countries or from trees originally imported to America from other lands.

Analysis of nuts have shown them to be of two types, one rich in fats and protein, the nitrogen containing component of our foods and the other relatively rich in carbohydrates, or starches. With the exception of the chestnut, and the coconut, most of our more common nuts belong to this first class, and chemists have pointed out that in these nuts we have a concentration of protein and fat seen in no other class of foodstuffs. For example, the protein-fat rich nuts have a percentage of protein varying between 15 and 30% and a fat content of 50-70%; compare this with other foods that we think of as being concentrated; eggs, 12% protein and 10% fat; cheese 28% protein, 37% fat; round steak, 20% protein, 14% fat; and bread, 10% protein. This nutritive concentration in nuts places them in a unique position among our natural food products. Our cereals, meats, fruit and vegetables all contain more or less water or refuse that reduces their concentration, while in nuts we find a compact form of almost pure food.

We are dependent on foods for the source of energy that is necessary to perform our work and maintain our body temperature much in the same way that a steam engine is dependent on the fuel supplied it to perform the mechanical tasks assigned to it, and this fuel value of foods in turn, depends on the amount of protein, carbohydrate and fat, particularly the latter, that are present in the foods. At once we see, in our concentrated nuts, a tremendous source of energy, provided that we can digest these nuts and make this energy available.

Despite the fact, as revealed by chemical analysis, that in nuts we have a source of protein and fat in a concentration rarely seen in foods, there have been relatively few experiments to actually determine the digestibility. Prof. Jaffa at the California Experiment Station was the first to make a comprehensive investigation along these lines. He made extensive digestion tests on men using most of the more common American nuts. His results, as reported in a bulletin of the U. S. Department of Agriculture, indicated that nuts when they made up a substantial portion of the diet, were well digested by those who ate them and gave no intestinal disturbance or discomfort.

Nuts have had a reputation for indigestibility that was wide spread, not only among people in general, but also among physicians and dieticians, and even Prof. Jaffa's clear cut experiments failed to dispell this idea of indigestibility that had been empirically assigned to nuts. A few years ago, a rather extensive series of digestion experiments were inaugurated at Yale University in an effort to settle this question of the indigestibility of nuts and also to-test out some of the commercial nut products to find what effect roasting, boiling, and other processes that nuts are subjected to, had to do with the digestibility. Through the courtesy of Dr. Kellogg of Battle Creek, it was possible to follow up these experiments with a series here at Battle Creek. It is the result of these tests that I wish to speak of today. One word regarding the method which is the conventional one for such experiments. The amount of food eaten by the individual or animal is weighed at each meal and the composition determined by chemical analysis. The intestinal output is collected, weighed and analysied. From the difference in any substance such as protein in the food and the protein which appears in the body refuse, the amount digested and absorbed or utilized by the body is easily determined. For example; if 10gms. of nitrogen were eaten in the food and one gm appears in the feces, we say that the coefficient of digestibility of that nitrogen is 90%, that is 9 of the 10 gms. eaten were absorbed by the body. The average of a great many such tests on mixed diets has the following standard coefficient: protein 93%, fat 95%, and carbohydrates 98%.

Our digestion experiments show the following results: for protein digestion of nuts, almond 89%, peanut 84%, pine nut 89%, Eng. walnut, 83%, Brazil 88%, and coconut 88%. In all cases the carbohydrate coefficients are 98 or 99%, and in the case of the carbohydrate rich chestnut, normal digestion took place after the nut was heated so as to rupture the starch granules. In all of these cases the nut made up a substantial part of each meal and was eaten in large amounts. The experimental subject, experienced no digestive troubles or discomforture whatsoever except in the case of the English walnut, which evidently contains some irritating substance that causes diarrhea. Except for the pecan which gave rather low utilization, the protein of nuts was digested to a high degree that compares most favorably with our ordinary foodstuffs.

How then explain the undoubted discomforture that many people experience after eating nuts? I believe that the explanation rests on the fact that our common American way of eating nuts, is not the rational way. We would not consider topping off a heavy meal with eggs, meats or cereals or to eat these in large quantities between meals realizing that we are exposing ourselves to possible digestive discomfort. No more then, can we expect to so eat nuts which are even more concentrated or "heavy" than meat or eggs without occasional discomfort. Unpleasant results from so eating does not condemn the nuts as indigestible, rather it condemns our mode of using that nut. Further, we must recognize that the nut is a hard, compact substance and that unless completely masticated, is not readily penetrated by the digestive juices of the alimentary canal. This was very well brought out in our experiment with dogs. The dog bolts his food and where there were large fragments of the nut in the food, they appeared almost unchanged in the feces, while if the nut is ground fine before feeding, it was readily digested. Comparisons of nut butters and nut pastes with the whole nut also brought out this point. The completely commuted nut butters showed consistently higher degrees of digestion than the whole nut.

With the exception of the starch rich chestnut, the heating of the nut did not seem to effect the digestibility whether this heat was boiling, steaming or roasting. The raw nut apparently is as well digested as the heated products. No differences were found between nut butters whether the process involved steaming or roasting of the nut. I am not speaking of the enhancing of the flavor that heating may bring about, but only of the digestibility.

Dr. Longworthy and his co-workers in the Dept. of Agriculture have investigated in recent years the digestibility of many vegetable oils, among them nut oils, and have found as high a percent of utilization with these as with butter and our other common animal food fats.

I believe that we are fully justified in the conclusion that nuts and nut products, if rationally used in our diets, are as digestible and fully as valuable from a nutritional point of view as our other foodstuffs.

While we can now definitely speak of the high digestibility of nuts, it is necessary to consider other phases of the part played by foods in nutrition. The fact that a food after being taken into the body can be broken up by the digestive juices of the alimentary tract, and the products absorbed, as we have found, to be the case with the nuts, is not the end of the story of the function of that food.

About fifteen years ago, it was discovered that during the progress of digestion, the protein materials are reduced by the digestive juices of our stomachs and intestines to smaller chemical compounds, and that it is these smaller fragments of the protein molecule that are absorbed into the blood and are used to build up our muscles and tissues. These fragments or "building stones" as they have been fancifully called, are all of a distant class of chemical compounds known to chemists as amino acids. Eighteen of these acids have been found as the products of protein digestion.

We may conceive of our bodies as being continually supplied with a mass of these 18 building stones from which it selects the kind and number that it needs to repair the everyday wear and tear of the tissues and in the case of the growing child builds new structures.

Since the date of this important discovery regarding the fate of indigested protein, it has been found that with few exceptions, the body is not able to manufacture these amino acids or to change one kind into another, and must depend on the protein eaten, for a supply of the various kinds that go to make up the body protein. Further it has been found, that many of our commonly used food proteins do not contain all 18 of these amino acids components. In some foods one, two, and sometimes more are lacking, or if present are in very small amounts. If our diet contained only proteins of an inferior grade, we can picture our body requiring building stones of various kinds to maintain the structure of the body and unable to obtain them due to the poor quality of the food, protein. Nutritional failure would be the result. The proteins then must be of the right quality as well as present in the proper quantities, to prevent mal-nutrition. Bearing in mind these facts. it is necessary in studying a food such as our nuts. to determine the kind of protein the individual nut contains as well as to know whether or not it can be digested by the body.

During the past few years. it has been found that we must have in our foods a certain amount of substances whose chemical nature is at present unknown and to which the name of vitamines has been given. It is not my purpose to discuss with you the many phases of vitamines and their relation to nutrition, but I only wish to impress upon you the fact that it is of the utmost importance for a dietary to contain these substances; fully as important as that the protein. fat. carbohydrate. and inorganic salt content shall be satisfactory. Lack of these vitamines brings on various evidences of mal-nutrition. One vitamine which is found in animal fats and the leaves of plants and is soluble in. and associated with fats. is. for that reason. called fat soluble vitamine. Another called the water soluble vitamine is widely distributed in cereal seeds. vegetables. and legumes. The third, the so-called antiscorbutic vitamine because of its action as preventative and cure for scurvy. is found in certain fruits and vegetables.

We then ask the next question: Are nuts adequate as far as their proteins contain these essential amino acids. and do nuts contain vitamines? That is. is their biological value as satisfactory as their digestibility?

Dr. Hoobler of Detroit. in a study of the diets of lactating mothers and wet nurses. a year or so ago. compared the value of proteins from animal and vegetable sources for the elaboration of milk. He found that a mixture of the almond. English walnut. peanut and pecan. furnished proteins that were equal to the animal food tried. and far superior to other vegetable proteins. Here then is evidence that nuts provide the necessary building stones to form milk that food par excellence for the newly born individual. Drs. Mendel and Osborn. experimenting on white rats have shown that the principle proteins of the Brazil nut will maintain animals through the growing period. Bureau of Chemistry workers and others have found similar results with the coconut and the peanut. I have now. experiments underway at New Haven. on the biological value of the filbert. English walnut. pine nut. almond. and pecan. While these tests are yet incompleted. it can at least be said that to date there is no evidence that the proteins of these nuts are in any way less satisfactory than those of the peanut or Brazil nut that have been thoroughly tested out.

As to the vitamine content, abundant quantities of water soluble vitamine have been found in the peanut and the coconut. Experiments that we have in progress as well as a series conducted here at Battle Creek under Dr. Kellogg's direction give promise to increase this list of vitamine containing nuts to include at least many of our common nuts. Along with our vegetable oils in general, coconut oil and peanut oil contain insufficient quantities of the fat soluble vitamine to maintain growth in young animals. Whether the other nut oils will prove more efficacious in this respect, is now under investigation. As far as I am aware, the antiscorbutic properties of nuts have not been studied.

With the population of the world on a steady increase, it continually becomes necessary for mankind to seek out new sources of food, and utilize products that formally had received little attention as possible foods. Conditions that disturb normal food production and distribution, such for example as were brought about by the world war, produce serious food shortages in the world, and emphasize how close is the margin that determines whether the peoples of the world have adequate quantities of food or whether they are faced by shortages, and, in many cases, by starvation. In this continual development of our food resources, nuts stand out prominently as offering possibilities which are very great. Not only do they represent a very concentrated form of food which is highly digestible, but they possess a number of characteristic and highly pleasing flavors that recommends them for use in all manner of culinary procedures. The variety of uses to which nuts can be put in the kitchen is amply demonstrated right here in Dr. Kellogg's sanitarium and I feel sure that even he has not exhausted the possibilities of nuts in the dietary. The forms of nut products on the market are steadily increasing. The nut butters, nut pastes, nut margarines, meat substitutes, and so forth, all point to the variety of ways that nuts can be handled as foods.

The tremendous increase in the use of nut oils in the form of the oil itself and as nut margarines within the last few years is a striking example of the utilization on a large scale of relatively new food products. The press cake which remains as a by-product of this oil industry finds ready use as concentrates for cattle feeds. Many of our ideas in the feeding of our domestic animals are undergoing development along with the idea of human nutrition. Just recently, investigators at the Wisconsin Experiment Station, reported that the well known "home grown ration" for dairy cows that consist of cereals, silage and hay, is not a large milk producing diet. Their recommendation is to supplement this ration with protein concentrates. Nut meals recommend themselves most highly as protein concentrates. It certainly is safe to say that the day when the fruits of our nut bearing trees will be allowed to fall ungathered from the trees, is at an end.

There are many problems that still call for an answer by the chemist and dietitian. The nutritive value of the individual nuts should be firmly established in all its phases. The causes that have made the use of certain nuts unprofitable commercially, should be studied with the view of correcting these stumbling blocks. For example, the freeing of the horsechestnut from its poisonous saponins and enable us to use this starch rich nut as food is well within the range of possibility as indicated by experiments conducted in Austria during the war. Why do nut oils tend to become rancid easily and can this tendency be remedied? Is the freeing of the acorn and its tannin and other objectionable substances a practical consideration? What is the irritating principle of the English walnut?

All these problems and many others wait solution. Research on nuts is in progress in many places. It involves time consuming experiments that are often times expensive. As a result, progress is slow, the amount of research being limited by the financial factor. The value of the pecan nut crop alone of the year 1918, was over 91 million dollars and the value of the imports and exports of nuts and nut products during the same year amounted to over 51 million dollars. If one one-hundredth of one per cent of this sum should be devoted by those interested in the development of our nut industry in this country for the study of the nutritional and chemical properties of nuts, I feel sure that they would be amply repaid for their investment.

President Reed: I believe this will complete our program for tonight. We have quite a full program for tomorrow morning. Mr. C. A. Reed, nut culturist of the U. S. Department of Agriculture, is with us and was to have been on the program tonight, but he has been busy all day and was hardly ready for tonight's program, as he has been busy getting the exhibit in order, and he will be on the program tomorrow morning, and three or four others, among them Dr. Kellogg, I believe, so that there will be quite a full morning's program, and we will be glad to have all of you come who can. We meet in the parlor of the Annex at ten o'clock tomorrow morning. If any one desires to join the Association and will speak to the secretary, he will give you the necessary information.

END OF TUESDAY EVENING SESSION

WEDNESDAY, DECEMBER 10, 1919, 10:00 A. M.

PRESIDENT W. C. REED IN THE CHAIR

PRESIDENT REED: Mr. O. C. Simonds of Chicago will talk to you on "Nut Trees in Landscape work."

NUT TREES AND BUSHES IN LANDSCAPE WORK

O. C. SIMONDS, CHICAGO, ILLINOIS

In considering material for landscape work the places that come to mind where such work would be required are home grounds, highways, parks, cemeteries, school grounds, city squares and woods. The highways would include city streets, parkways, usually called boulevards, and country roads.

All trees are beautiful and should serve in some place in landscape work. Some are more beautiful than others and where but few trees can be used the more beautiful would naturally be chosen.

BLACK WALNUTS

Not long ago, a lawyer was talking to me about the beauty of black walnuts. To his mind there is no tree more beautiful and from what he said, he would use it almost to the exclusion of other trees. My own judgment does not fully coincide with his although I consider a black walnut a very attractive tree. It grows to a large size and is generally healthy. Its shape is good and the foliage attractive in summer. The leaves drop early and they are not especially attractive in autumn coloring. Black walnuts are strong in appearance. They lack the gracefulness of the elm and if I were making a list of trees in the order of their appearance, placing the most beautiful first and the least attractive last, I should place several trees ahead of the black walnut, among them sugar maples, elms and several of the oaks. Perhaps the black walnut would come about in the center of the list for most locations. The list itself would vary for different situations and climates. I should advise using black walnuts plentifully along the highways, especially country roads, and somewhat sparingly in home grounds and the other locations which I have named. By plentifully, I do not mean to the exclusion of other trees, for, in some places, there should be more elms and maples than black walnuts, but highways are so extensive that many kinds of trees could be used in abundance to give shade. In woods there are places where black walnuts could be used in profusion.

The objections that one might raise to the use of black walnuts would be, first, the comparatively short season of the leaves. These come out rather late in the spring and drop early, probably these trees can not be improved very much in this respect. Second, boys will sometimes throw sticks at the trees to bring down the nuts. If a boy comes in home grounds to do this, he will be considered a nuisance. Branches are sometimes broken and the trees disfigured from this cause. Along highways this objection might perhaps be lessened somewhat by planting enough trees so that there would be more nuts than the boy would want, or by improving the manner of the boy. Third, the trees are often attacked by caterpillars. This objection can usually be obviated by spraying or destroying the pests in other ways.

BUTTERNUTS

The remarks made about the black walnut would apply in many ways to the butternut, its nearest relative. Butternuts have a range extending further north and they are more subject to disease than the black walnuts. Like the walnut, their leaves come out late and drop early. They are subject to the attacks of boys. When healthy, they are attractive in appearance and they deserve to be planted in most places where trees are used for landscape effect, but in the list I suggested, they would come below the black walnut.

HICKORIES

There is a time of the year when the shagbark, which produces such sweet nuts, would be more attractive than any neighboring tree. It is when the big buds swell and send out yellowish green leaves surrounded by large red bracts. At this time they are as showy and as beautiful as any flowers. The bracts soon fall, but the leaves turn a rich green and are attractive until early fall, when they are sometimes yellow, and sometimes drop without any marked coloring. The trunk of the hickory is unique in appearance as the bark separates from the tree in long platelike strips which hang on at one end and give the scraggly appearance from which the tree derives its name. All of the hickories are attractive in appearance, but some of them drop their leaves early. The hickories are difficult to transplant but this is nothing against the beauty of the tree. An established tree is more valuable on this account. In some places hickories are quite subject to disease or to the attacks of borers. Like the walnuts, hickories which produce edible nuts are subject to the attacks of boys, but, on account of the toughness of the wood and the roughness of the bark, they are usually quite able to withstand these attacks. Hickories are suitable for use in all landscape work so far as their appearance is concerned. The fact that they are not so used is due to the difficulty of transplanting them. In the fall when a maple tree has colored up beautifully and a hickory near it has dropped its leaves, we are apt to compare the two unfavorably to the latter, but we should remember the appearance in summer and especially when the leaves first unfold. Hickory trees are beautiful also when the leaves are off, their branches making beautiful etchings against the sky in winter. The pecan, which is the largest of all hickories, is an exception to the general rule because it is planted quite extensively, especially in the South. It is a beautiful tree and where it is hardy there is no reason why it should not be used as a street tree, a tree in home grounds, in parks, or any other place where deciduous trees are needed. It is raised extensively in some nurseries, while the other hickories are raised very sparingly, and some not at all.

The Beech

Some would consider the beech the most beautiful of all nut trees. Its comparatively smooth, bluish-gray bark makes it a distinctive tree at all seasons. Its branches, spreading straight out from the trunk, give it an appearance of strength. Its fine branches form a specially pleasing skyline, its sharp buds are trim and neat in appearance, its leaves are beautiful in shape and texture. Their fall coloring, while not as brilliant as that of the maples, is really beautiful, being either yellow or a rich brown. The leaves are apt to hang on all winter, especially on the younger growth, and then they often turn a straw color. If a list of beautiful trees for February were to be made, I am rather inclined to think that the beech would stand at the head of the list. A young beech with its bluish-gray bark, its straw colored leaves, and flecks of snow here and there, seems to me the most beautiful of all deciduous trees in winter. The young leaves also are especially attractive when they first appear and the blossoms are sometimes objects of interest, although not showy in color.

HAZELNUTS

Often in old pastures one finds forlorn, scraggly looking bushes and is told they are hazelnut bushes. One would not pick out bushes like these to plant in his front yard, and yet, when given a chance, there is scarcely a more attractive shrub than the hazel. It is one of the first shrubs to blossom, the staminate flowers hanging in slender, graceful yellowish-brown catkins, while the pistillate flowers are little points of purplish-red protruding from the buds. These blossoms appear long before the leaves. The latter, when fully developed, are beautiful in outline and soft in texture and they have a rich coloring in the fall including various shades of yellow and red. The hazel should certainly be used extensively in landscape work. The nuts, with their leaflike involucres, are attractive in appearance in August and September. In connection with our own hazel one would naturally think of the filbert, which is a European relative. The filbert is often planted for ornament. There is a variety with purple leaves which some people admire.

THE OAKS

Of all our native trees, I think the oak excels in beauty of foliage. By many oaks might not be considered nut trees, but nearly all of the acorns are eaten by squirrels or other wild animals and so I think it would be proper to mention oaks when speaking of nut trees in the landscape. In the northern states we have two groups known as the white oak group and the red oak group. The trees of the former have soft, dull green leaves with rounded lobes, while those of the latter have shiny leaves with lobes ending in points of filaments. The former mature their acorns in one year, while the latter require two years to bring them to maturity. The acorns of the white group are sweet, while those of the red group are more or less bitter. The foliage of all oaks is attractive when it first appears, the small leaves varying in color from almost white through pink, yellow, and red to the deepest purple. Perhaps the red oak excels all other trees in the beauty of its summer foliage and its leaves are also richly colored in autumn. The Bur Oak, in addition to having attractive foliage, has a rough, dark bark that gives it an attractive appearance in winter. The white oak, especially when young, holds many of its leaves in spring and these with their brown color, give a warmth to the snowy landscape. One could make a most beautiful park by planting nothing but oaks and they should rank with maples and elms as street trees.

CHESTNUTS

There is a tree which a few years ago would have been considered along with the oak in landscape work, but which now would not be thought of in certain regions on account of a disease which has practically destroyed it. This tree is the American chestnut. It grows to a large size, and if it were not for this disease, would be worthy of a place in any park. Hundreds of thousands of dollars have been spent without success in endeavoring to exterminate the disease. Some of the introduced varieties are apparently exempt from this disease, but only the future can tell whether the chestnut will again become valuable in landscape work as well as in the raising of food and lumber.

In designing landscapes, we think first of open spaces and then bound these spaces with trees and shrubs having pleasing shapes and foliage. The tops of these trees form the skyline and the lower growth a margin of lawns, or perhaps of walks and drives. For these purposes the beeches, hickories, hazels, walnuts and butternuts are all valuable, their value being approximately in the order named.

HORSE CHESTNUTS AND BUCKEYES

There may be some question about including these in a list of nut trees. I understand, however, that the seeds of all of these trees have been used for feeding stock and perhaps some way may be found for making them available as food for men and women. There is no question about their usefulness for ornamental trees. In Europe, the horse chestnut has been used extensively for park and boulevard planting and it is also largely used in the United States. There are several varieties. The leaves appear early, the blossoms coming out later. Our own buckeyes are handsome in appearance and all are adapted for use in landscape work.

The arguments for and against the use of nut trees in landscape work would be somewhat similar to such arguments regarding fruit trees. A luscious fruit tree like the snow apple, would be omitted from the list of trees for the park, not because it lacks beauty, but because its fruit would lead to its destruction. Apple trees might, however, be very appropriate for private grounds. They have sometimes given a name to a home, as "The Orchard". The same is true of certain nut trees, "Walnut Hill," and "Hickory Grove" being not uncommon. The hazel, too, is frequently used in naming home grounds, streets or localities. A name would not be used in this way unless the object bearing it was held in esteem. I am glad there is an association to encourage the raising of nut trees and I hope to see such trees used in this way extensively, for the purpose of developing attractive scenery as well as for food production.

Mr. Simonds: When Mr. Bixby asked me to prepare a paper and come here and read it, I wrote back I would prepare a paper and send to him to read; and afterwards Mr. Reed came to see me, and knowing that he would be here, I concluded I would come. I dictated a paper and afterwards I found I had left out a few nut trees, and I want to speak just a word regarding those before I read my paper. One of those is the coconut palm. I was thinking more particularly of trees in this locality when I dictated the paper; but the coconut tree aside from raising the coconuts, I think is the most magnificent palm that we have. There are other trees that some like better, but I think the coconut palm is the most picturesque, the finest tree to plant. I prefer it to the other large palms. It has great spreading leaves, sometimes fifteen or twenty feet long, a feathery top, and the trunk is not quite straight, and I like it a little better because it is not. Then here is the English walnut. I did not speak in my paper about the English walnut, but there is a tree that is a beautiful tree, and where it is hardy it should of course be planted for ornament as well as for the nuts. And then there is the almond which we do not have here as a nut tree, but which they have in California, which has some attractions, and might be planted, although it is really not so ornamental as some of the nut trees; still it is worth planting. (Applause).

President Reed: Are there any questions you would like to ask Mr. Simonds while he is with us, or is there any discussion?

Dr. Morris: There are two or three points for discussion. Mr. Simonds does not think highly of the almond. I do for decorative purposes. When I drive in my driveway at Stamford and face that magnificent blaze of blazing clouds of almonds in the springtime, I think it is something worth while; it is the hard shelled almond. It will grow as far north as the peach does. The only trouble is they are a little more subject to leaf blight and need a little more attention. But where the peach will grow you can raise the almond profitably. Among the hazel nuts the most beautiful of the entire series is the tree hazel that grows about as large as the smaller oaks, and that is said to bear twenty-five or thirty bushels of hazelnuts a year, enormous crops. That is perfectly hardy here, and the beauty of the tree is such that I believe it to be a very important addition. I would like to hear Mr.

Jones' opinion on that point. I use it for grafting purposes for other hazels. The Japanese walnuts, almost tropical in their rapid growth, sometimes grow six feet in a year in rich ground, and with their great sprays of leaves sometimes a yard in length, and the seedballs of the heart nut variety give really a tropical appearance to the grounds where the ground is rich enough. They will grow almost any place, but in rich ground they are certainly very wonderful. Among the chestnuts, of course, we have a number of hybrids now that resist blight very well; and the little chinkapins for lawn bushes are very attractive. One of our most beautiful chestnuts is splendid for a lawn specimen and is evergreen in the South. When I was a boy I never had plums enough; so one of my ambitions was to have plums enough so I could see some of them rot on the ground. We can do the same thing with nut trees—have nuts enough so the boys will be full and have nuts enough. It seems to me it ought to be one of our ambitions to have so many nut trees along the roadsides in the parks, etc., that the boys and the squirrels can not use them all up.

Mr. Simonds: I think the Doctor is right in some of his criticisms. In fact, the almond is something like a peach, and I had not prized it for use in landscape work so very much on account of certain diseases which would be apt to affect it here if it were not taken care of as we would take care of trees in an orchard. The hazel tree, of course, would be attractive if it is hardy here. I have had doubts about its being hardy because of its coming from southern Europe.

Dr. Morris: It is hardy in all Canada. They have fine tree hazels in the park at Rochester. They have there probably the largest tree hazels in the country.

Mr. C. A. Reed: I would like to have more questions asked. I feel as though I had accomplished a real achievement in getting Mr. Simonds here. I was under him a short time a number of years ago and learned something of his skill as a landscape gardener and the reputation that he has; and I felt that we could not hope to have a better authority on these points that he has discussed than we could in Mr. Simonds; and it is something that is constantly coming up. The Department of Agriculture have to consider that people want to know what trees they can plant in the landscape; and I feel particularly glad to have Mr. Simonds here.

Dr. Morris: It seems to me we ought to talk more about the nut-bearing pines in the landscape, because where you are planting pine trees, you might as well plant the nut-bearing kind as the others; they are just as beautiful, and you combine the Greek idea of beauty and utility.

Mr. Simonds: Certainly, that is a tree I have omitted, because in this region we have not had any nuts.

Dr. Morris: There are four pines that will bear nuts here—the Korean pine, the pignolia or stone pine, the Italian stone pine and the Swiss both. There are five nut bearing pine trees that are all market trees for nuts, that I know will grow and bear here, including the lace bark pine.

Mr. Simonds: Are they raising nuts in Michigan on pines?

Dr. Morris: No, but they might. Those five kinds would grow here and bear nuts here, so they have a double value.

Mr. Simonds: I think we ought to raise them. Of course they are beautiful in the landscape.

Dr. Morris: The whole idea of your paper is to approach the Greek ideal—add utility to beauty.

Mr. Simonds: That is what nature does. It makes beautiful leaves, then uses the leaves for plant food.

Mr. C. A. Reed: I wonder, Dr. Morris, if you can tell where these pines can be had.

Dr. Morris: The Korean pine is from north-east Asia, and you can get those from the original pine seed; the lace bark pine is from north-eastern Asia where the climate is like ours. The Swiss stone pine and the Italian stone pine are from Switzerland and Italy and closely related—both excellent trees. The fruit now you buy as the pignolia in the markets. Both those are sold as pignolia nuts. It is a commercial nut of Europe. The white barked pine you would get from the West. It has a beautiful fine large nut, and you would get that from any Pacific coast dealers in nut trees.

Mr. Simonds: Has that another name?

Dr. Morris: I do not know of any other name for it. Wait: The single leaved pine is one. That grows so far north on the Pacific, but we do not know whether it will ripen its nuts here or not. It is perfectly hardy here and would be a beautiful nut tree, grows well. The single-leaved pine—that is *monophylla*. There are four or five pinons that will live, but they do not grow fast enough to make it worth while to raise them in Michigan. The Jeffrey bull pine is another one that will grow here and bear fruit, with a beautiful blue-green foliage. The Jeffrey bull pine is one of the most beautiful and thrifty pines. That is the Jeffrey variety of ponderosa. The nut is very much larger than the nut of the ordinary ponderosa. The nut of the ponderosa is small, but the Indians use them and eat them, shell and all. When we come to using the pines more freely for food purposes, we are going to do what they do in Europe with some of the small seeded pines—crush them and make a mass, squeeze the cream out from the nuts, dry it a little, and that makes very fine rich cream; then the residue is given to the chickens and pigs. There are in all about thirty pine trees now that are used for market purposes where they fruit, and we will undoubtedly increase that number. I do not doubt that fifty species of pine trees will be planted for their fruit by two generations from now when we feel the need more.

President Reed: We will be glad to have questions from any one. I think we get more from the discussions than we do from the papers.

Voice: In regard to the hickory nut, the shagbark, back in northeastern Ohio, four years ago we had quite serious trouble with our hickories there along in the month of June, about the time we get the common June bug, there was a large bug that looked like the June bug that seemed to work at night mostly. We did not see them active in the day time, but they ate the foliage entirely off the lower branches and those limbs from which they ate the foliage died. In some cases, the tree died. I would like to know if anyone knows anything about those. That was new to me. I have had opportunity to answer all sorts of questions about that. I have been asked I guess by a thousand different people about that insect, and I have not been able to learn anything about it.

Mr. Simonds: I can not tell you.

Same Voice: One man told me when he knew I was coming here, "For goodness sakes find out something about that if you can.

Dr. Morris: It probably is the June bug, and turkeys and ducks would solve the problem.

Mr. C. A. Reed: The only suggestion I would make is that in Ohio you have one of the best posted authorities on nut insects there is in the country. That is Prof. H. A. Gossard, at Wooster. If he can not tell you about it, no one can.

Mr. J. F. Jones: I think it is no doubt it is the ordinary May beetle that is doing the mischief.

President Reed: I might say we had quite a deluge of beetles along that line in the nursery a year ago this last June, the first time we have ever been bothered with them. They finally became so thick we had to go through and shake the trees and shake them off. They looked something like the May beetle, only smaller, hard shelled, and seemed to come by the millions; but they only lasted a few days, and it was all over, and we have never seen them since.

Mr. C. A. Reed: There is one more question I would like to ask Mr. Simonds, and that is in regard to the proper distance for spacing nut trees along avenues and in parks.

Mr. Simonds: I think that in both of those situations it is well to give the trees a natural appearance by grouping, and sometimes they can be far apart, and sometimes I think there might be a group of two or three close together, so that they would grow in one group. That will give a more natural arrangement in parks, and we have room enough along the sides of most of our highways to have the same effect there. The policy to be pursued with regard to spacing nut trees along highways would be the same that we would follow in planting any other trees, and one of the most attractive streets I know is now in the city of Grand Rapids; it used to be in the country when I lived there years ago; but along the sides of that street there are native trees, mostly burr oaks, and they have grown just as nature planted them. There will be a group of two or three, then a space, may be a single tree, then there may be a group of five or six; and that natural arrangement is really beautiful, to me far more beautiful than a straight row of trees, uniform spaced. On that same street sixty or seventy years ago my uncle planted where there were no trees—it is a continuation of this street—rows of sugar maples, and they grew and finally made splendid trees, and a great storm came along and broke down two or three, and that was a source of great regret to my uncle; but his son thinks, perhaps, it was a good thing, because it opened a beautiful view out into the country. Now by grouping trees we can save beautiful views. If we plant uniformly, we get monotony. With this belt of burr oaks spaced as I have described, you have variety on your sky line. Some trees are a little farther up than others and catch the sunlight, and we get shade and light. That is the way I should plant nut trees. If I were planting black walnuts or butternuts I would group them, but see that the tree has in some directions space enough to develop as far as it wishes.

Mr. C. A. Reed: Mr. Simonds is about to go. That is the reason I precipitated this question at this point. It was asked with reference to the law which these gentlemen, sitting at my right here, were responsible in putting through in the legislature of this State—provision for planting food trees along the highways: and it may be before Mr. Simonds goes, they have something further to ask.

President Reed: These questions are very important to draw out information. Is there anything else you wish to ask before we leave this topic? If not, we will call on C. A. Reed to present his paper next. It was carried over from last night, I believe.

NUT CULTURE IN MICHIGAN

C. A. Reed, Washington, D. C.

There is evidence on all sides that the people of Michigan are deeply interested in nut culture. Some have invested in pecan lands in the Far South; no doubt some own Persian (English) walnut. almond or filbert orchards on the Pacific Coast; and others are at the point of planting nut trees in Michigan. Everybody would go nutting in fall if he could. Michigan leads all other northern states in what its institutions and some of its people have done toward developing the nut industry.

Some thirty years ago the Lake Shore and Michigan Southern Railroad Company showed its interest in nut production, when it planted many miles of chestnut trees along its tracks running north from Adrian. Between 1888 and 1892 there were planted on the grounds of the sub-experiment station at South Haven, a number of pecan trees of Iowa and Missouri seed. Japanese walnuts. a number of filbert plants and a collection of almond varieties. At about the same time, Prof. L. H. Bailey set out half dozen pecans and Japanese walnut trees on the campus of the Michigan Agricultural College. Later, Professor L. R. Taft added several seedling Persian (English) walnut trees to the group.

In traveling over the southern part of Michigan. one cannot go far without seeing signs of interest in nut trees. Everywhere the black walnut has been spared or planted. In certain sections it is to be found about practically every farm house or at least near enough by to furnish the winter supply of the family nuts. The chestnut is less common in any part of the state than is the black walnut, not appearing to any considerable extent except in the lower southeastern corner. It has not fared well in the state either as a native or planted tree. The Persian or so-called English walnut has attracted considerable attention from time to time. and under especially favorable surroundings one occasionally finds thrifty specimen trees. The pecan.

the Japanese walnut, European hazel or more popularly called the "filbert" have all been given limited trials at various times. Even the almond has had a day in Michigan. Quite possibly the pistache has been through the same experience; but if so, the fact is not generally known. That species is from arid Asia and wholly unlikely to succeed in the latitude of Michigan although a young tree of a Chinese species ornamental because of its fine feathery foliage, green in summer but which takes on a brilliant hue in fall is, or was the last we know, doing well on the private grounds of Dr. Robert T. Morris, near Stamford, Conn.

Among the kinds of nut trees from which we can select varieties for planting in Michigan, there are eleven or more distinct species. With such a range as this, one might ask, why not go into nut growing in Michigan on the same scale as in the growing of apples and peaches. There are probably better reasons why this is not being done, but two very good ones are that there are not enough available trees of good varieties to plant more than a single orchard of respectable size in the state; and the other; it would not pay to put good Michigan land to nut trees of such varieties as are now available even though they could be had.

If nut trees can't be had and wouldn't pay if they could then why publish an article on "Nuts for Michigan Planting," is probably what will run through the minds of most readers of these lines. It is certainly a logical question, but there are at least ten reasons why nut trees should be planted in Michigan

1. The forests of Michigan have reached the point of depletion such that for the sake of future generations, trees of some kind other than fruit must be planted.

2. While planting, we may as well select those capable of performing more than a single service; in other words, trees of maximum possible use. Oaks, poplars, ashes, pines, elms, etc., all have their places, but not one in the group can produce anything of food value to humankind.

3. Nut trees of most kinds, rightly used, are valuable for timber purposes and are very effective in the landscape.

4. Members of the walnut family including the hickories are especially appropriate along the highways and city streets. They are sturdy, long-lived and not easily damaged by storms or neighbor's boys.

5. Nuts are among the very best of the meat substitutes. They contain much of the same food elements as do meats, although in

different proportions. Some contain starch and to that extent can be used as are the cereals and Irish potatoes. Nuts are the only vegetable product grown in Michigan, which in raw condition afford a complete and fairly well balanced food for human beings. Every pound of nut food that can be raised from a tree along the street or in the fence corner on the farm is clear gain, and that much added to our national food supply.

6. Nuts are rapidly assuming importance as factors in the lists of American foods.

7. Many species of nut trees are adapted to some parts of Michigan. By planting the best that are now available, and by constantly being on the lookout for better sorts, superior varieties will be certain to develop in a short while, the same as has been the case with all older orchard fruits and farm crops.

8. Whoever intelligently plants nut trees performs a distinct public service. He will receive the gratitude of more than the present generation.

9. Among all kinds of trees, none are more appropriate for memorial purposes to the men who did not come back from France, than is the black walnut. That species itself took a valiant part in warfare. It furnished material for gunstocks the same as in previous wars, but in the World War it rendered what was considered by eminent authority, a greater service in supplying propellors for aeroplanes. The shells of the nuts contributed their part toward the making of carbon for gas masks, and no one knows the extent to which walnut kernels made up the delicacies sent from home to the boys in the trenches. With such a service record as this, the black walnut is entitled to a memorial of its own. Its value as a timber tree, as an ornamental, and as a food producer, together with its great range of adaptability from North to South and East to West, should justly entitle it to recognition as a National tree.

10. Michigan has a law providing for the planting of nut trees along its highways. Thus, the state has officially put its approval on the idea and has become a leader in the encouragement of this great kind of economy and thrift. It has taken a step toward conservation in a direction which is highly developed in certain parts of Europe. The product is sold to the highest bidder and the income used in the upkeep of the road system. In that manner the roadways of those sections take care of themselves. In this country millions of dollars of

state and federal moneys are being used this year. (ending June 30, 1921), in the construction and upkeep of public roads.

Desirable as it would be to accomplish these ends, it could not all be done at once. Even though there were an abundance of available trees of tried kinds, it would take a long time to plant them and to care for them until they might become of profitable bearing age. also public opinion would need to be remolded in order to insure their care and protection. Still it can and will be done. The movement is already on; the Michigan law began to operate soon after being passed, and the Division of Forestry at the Agricultural College is raising the trees for planting. Public opinion regarding the care of the trees and their product will take care of itself when the value of the trees and their products becomes apparent. Both in California and in Oregon not only nut but fruit orchards and vineyards. grow beside the roadways with no protection other than that of public opinion; and what has been done in one part of the country can be done in others as well.

The eleven species referred to as being available for Michigan use are as follows: The almond, beechnut. butternut, chestnut, filbert, (hazel). pecan, shagbark hickory, shellbark hickory, black walnut, Japanese walnut, and the Persian or so-called English walnut.

Taking these up in order we will consider first the

ALMOND

Except as an ornamental, the almond does not offer a great deal for use in Michigan. It is sometimes said to be as hardy as the peach, but only as this refers to the tree and not to the fruit. is it true. Certain hardshell almonds edible, yet so inferior to the improved varieties as to have practically no market value. do sometimes succeed in lower Michigan but their value is limited to their beauty when in bloom and to the production of a low grade product. In form and general appearance these almonds are much like peach pits. Very often they contain much of the same bitter taste of Prussic acid common to the kernel of the ordinary peach. They are interesting to observe while growing especially as they begin to ripen. The covering outside the seed is thin and leathery and while ripening, splits and peels outward in curious fashion.

Perhaps the only recognized variety of almond of this class which is known to have fruited in the East is the Ridenhower from southern Illinois. Trees can be had from some of the nurserymen.

THE BEECH

One of Michigan's noblest, hardiest, and most often abused trees is the American beech. It is common from north to south. No tree is more handsome and none, unless possibly it be the white birch, is so often defaced. Dr. Robt. T. Morris, of New York City, reminds us that according to the scriptures, man, genus *Homo,* is a finished product made by and in the image of the Creator. A safe assumption is that the scriptural reference is not to the creature whose initials appear on the trunk of a beech or whose knife has removed bark from white birch. His genus is not *Homo,* and he is not scripturally recorded.

The beech is not directly important as a nut bearing tree, but indirectly it is as the nuts are rarely harvested. Indirectly it is of great value. No food is better for turkeys and hogs than are beechnuts. A bushel of beechnuts that can be used in this way replace at least a bushel of corn. The difference in cost of production should make beechnuts worth several times as much as corn.

In Europe a valuable oil used as a drug and for salads is expressed from beechnuts. Possibly individual trees could be found somewhere in Michigan which produce nuts large enough, good enough, and in quantity enough to justify their recognition and propagation as named varieties.

No matter whether distinct varieties appear or not, the beech is well worthy of planting in many places about both the farm and the city lot.

BUTTERNUT

A member of the walnut family known also as "long walnut" and as "white walnut" is the true butternut. It has a smaller range of adaptability than does the black walnut but is found considerably farther north. On the Atlantic coast, its native range extends into Nova Scotia. In parts of New York State and New England, it is one of the most common species. It is well known in Michigan where, to many people it is the favorite of all nuts. The tree is less durable and longlived than is the black walnut. It is less well suited for use in the landscape and its timber value is probably the least of any native walnut.

Within very recent years one or two promising varieties have been introduced by the nurserymen. The first and only one now available is the Aiken from New Hampshire. The nut cracks well and the kernels are of pleasant flavor, but as a variety it has not been tested long enough to determine its adaptability to conditions in other states nor the extent to which budded trees will be productive.

CHESTNUT

Perhaps the greatest of all tree tragedies is represented by the chestnut. Once a dominant species in many parts of the East, it is now merely a wreck of its former self. In whole states along the Atlantic Seaboard, it has been wiped out by a fungus disease introduced from Japan some 25 years ago. Pennsylvania allows no chestnut trees to be shipped outside its limits for fear of further spreading this disease. So far as known chestnut trees from west of the Wabash River are free from infection. From Illinois, there have recently been introduced several varieties of chestnut supposedly of pure American parentage which are quite the equal in size of the European sorts but which have the sweet flavor of true American strains. In protected places in the southern part of the Lower Peinnsula these chestnuts should be well worthy of trial. They are, indeed, splendid chestnuts. The principal varieties are the Rochester, Progress, Fuller and Boone. The last is not related to the others; but is the result of an artificial cross between the American sweet chestnut and the Japan Giant.

HICKORY

Next to, or perhaps equal to the black walnut, the hickories are among the best known of Michigan's nut trees. Belonging to the same family as do the walnuts, they require much the same soil for their best development. They are slower of growth and even harder to bud and graft or to successfully transplant. Nevertheless, some of hickories bear splendid nuts in liberal quantities. Quite a number of good varieties have been named and a few propagated. They are mainly of the shagbark species although some are shellbarks, some pignuts, and a few hybrids. The true shellbark is not found in Michigan and would probably not succeed there as well as do others. In character of growth, the shellbark is much like the shagbark but the nuts are much larger, and the shells extremely thick. Among the good shagbarks there are the Swaim, Weiker, Kentucky, Manahan, Taylor and Vest.

True hickories ordinarily do not attain important habits of bearing until from 15 to 25 years of age.

PECAN

The pecan is easily the favorite and most important nut of American origin. Contrary to current ideas, it is not an introduced species nor are the best pecans grown in California. The pecan has become one of the leading nuts of this country by rapid but natural processes. In the forests, it is indigenous as far north as the southern part of Indiana, and in western Illinois it is found at the latitude of Chicago. Seedling trees at South Haven and on the campus of Michigan Agricultural College have borne occasional crops but the climate of Michigan is too severe for pecans to bear regularly. The trees of northern origin should do well enough over much of lower Michigan to be worthy of planting. Good varieties are the Major, Greenriver, Niblack, Indiana, Busseron and Posey.

BLACK WALNUT

Already the black walnut had been referred to in this article. In its further behalf may be said that like the pecan it is one of America's most rapid growing valuable trees. It does not grow with the speed of a poplar, a willow, or a linden. Neither does any other tree of value or longevity. Two 6-year-old trees of the eastern black walnut grown in the Wiliamette Valley of Western Oregon, bore approximately a peck of nuts apiece, in 1919, when they were photographed by the writer. In good soil and under favorable conditions of growth, it will be seen that the black walnut is not always slow in developing but that it is sometimes a rapid grower.

Three varieties of black walnut are now available from the nurserymen. They are the Thomas from Pennsylvania, the Ohio from some 20 miles south of Toledo, and the Stabler from Howard County, Maryland 15 or 20 miles outside the District of Columbia. All are prolific, precocious and of superiour cracking quality. The Thomas was discovered and first propagated some 30 years ago. The young grafted trees show a tendency to begin bearing in the nursery rows.

At the present time, the black walnut is regarded as being of greater promise for planting in the northern states than is any other species either native or introduced.

THE JAPANESE WALNUT

To a considerable extent this species has been confused with the Persian walnut, although the two are quite unlike. This is a dwarfish species with dull green rough leaflets often as many as 15 or 17 per leaf, which often bears nuts in clusters of a dozen or more. While green the outer hulls of the nuts are rough and somewhat sticky.

The Persian walnut is a standard-sized upright growing tree with bright green leaflets, usually 5 to 7 per leaf, and smooth, round nut hulls which split open and shed the nuts automatically.

The Japanese walnuts hybridize freely with other species of walnuts and produce nuts of all types; not infrequently crosses of this kind resemble butternuts so closely as to be practically indistinguishable from them.

True Japanese walnuts have a range in form of two distinct types. The better known is of guinea egg shape; the other, often known as the heartnut, is of distinct heart shape. Neither is large; the former is of about the size of a guinea egg or smaller; the latter is still smaller. Both are like the black walnut in being encased in a rough outer husk, which upon maturing shrivels and adheres to the surface of the nut. The shells are thinner than are those of the black walnut, but thicker than are those of the Persian walnut. When well matured, the shell of the heartnut tends to open slightly at the apex, after which it can be readily split in half with a knife blade. The flavor of the kernel is much like that of the American butternut.

The Japanese walnut is ordinarily hardy wherever the black succeeds. It is by no means uncommon in Michigan where it is especially appropriate for family planting. For the present, seedling trees will have to be relied upon almost wholly, as very few varieties have been propagated. So far as the writer is informed, the only named variety available from a northern nursery is the Lancaster introduced by J. F. Jones, a nurseryman at Lancaster, Pa.

PERSIAN WALNUT

Perhaps no species of nut tree has attracted as great attention in Michigan as has the Persian walnut. Under some conditions it does well for a time in the eastern or northeastern states, but on the whole its performance is distinctly erratic. Commercially speaking, it is of importance in this country only on the Pacific coast. Trees on the campus at Michigan Agricultural College and at many private places in the central part of the state, have come to little. Usually they grow well in summer only to freeze back nearly as much in winter. In Saranac County, eastern Michigan, close to Lake Huron there are a few young orchards that are in good condition, but a half mile back from the lake the results are discouraging. The same is true next to Lake Michigan from Grand Rapids south to the Indiana line.

The only recommendations that can be made relative to planting the Persian walnut in Michigan are, that it be planted very cautiously in any part of the state and except under very favored circumstances it be not at all in the middle of the state.

Do not undertake to grow the trees by planting the nuts or by buying seedlings. The most desirable trees are those of hardy varieties, budded on the black walnut as a stock a foot or more above ground.

THE FILBERT

The filbert has been one of our tantalizing species of nut trees. In England, trees grow to ages of from one to two hundred years, bearing profusely meanwhile. There, for many years, they are grown under apple trees with currants below them. In Germany, we are told that strawberries are grown below the currants and gooseberries. We are waiting for the Yankee who will be first to grow peanuts or potatoes below strawberries. In the eastern part of this country, plants of the European kinds are disappointing in two ways. First, they are uncertain as to their ability to bear; and second, they are highly susceptible to a fungus disease found everywhere that the native hazels abound. The native species is quite able to resist this disease, but the introductions ordinarily succumb to it quickly.

In the Pacific Northwest, where by many filbert culture is believed destined to become a successful and paying industry within the next few years, not infrequently some varieties begin to blossom as early as in December. The blooming is largely responsible for the failure of eastern trees to set and mature crops of nuts.

Several nurserymen are now endeavoring to find varieties of commercial value in the eastern part of the country. Apparently they are meeting with some success as far as their work has gone. Many of the varieties they are testing are proving inferior, but a few have borne good nuts in gratifying quantity for several years. During the past winter, a good many froze severely, although they are commonly hardy under severe weather.

Wherever they are planted, they should have fertile soil, from 20 to 25 feet of space each way and should be trained to tree form. After 10 years or so, they should be headed back severely, unless regular pruning has been practiced in the meantime. Filberts fruit only on new wood.

To those who have read this article to this point, it is now apparent that the nut industry of Michigan lies almost wholly in the future. The native varieties form an excellent ground work for that future, but to properly take advantage of that base, it will be necessary for practically every nut lover in the state to lend a helping hand. The first great movement necessary is to examine the nuts in the fall as they ripen in order to find the best of the walnuts, hickories, native hazels, beeches and introduced chestnuts, walnuts and filberts. In this everyone can help. Whoever finds a tree of any kind bearing superior nuts will render a great service by sending specimens, together with his or her address and that of the owner of the tree to the Federal Department of Agriculture at Washington, D. C., or to Willard G. Bixby, Treasurer of the Association, Baldwin, Nassau County, N. Y. Be sure to carefully note the exact tree, from which the nuts were obtained and if specimens are sent from more than one tree, they should be kept separate and each carefully labeled. Such nuts will be examined and if found to be the equal or superior to the varieties already being grown, they will be named and arrangements made for this propagation and test.

No prizes are given by the Government but good nuts sent the Government will be eligible to entry in the contest of the Northern Nut Growers' Association. If enough specimens are sent the Department, some will be forwarded to the Treasurer of that Association who has charge of awards.

According to very recent reports, the outlook for a nut crop during the coming year was never better. This should, therefore, be an excellent year for finding the trees bearing the best nuts.

President Reed: I believe Mr. Reed expects to give an additional talk tonight with lantern slides.

Mr. C. A. Reed: There will be an informal talk, a question box this evening for the benefit of any interested in the general discussion of nut culture in the United States. I notice the guests of the institution are deeply interested in nut growing in their particular states; so the arrangement for this evening is to give those persons an opportunity to come out and ask questions.

Mr. Olcott: While Mr. Reed is on that subject, I would like to ask if there is a chestnut as large as the Boone or other chestnuts grown by Mr. Riehl of as good flavor as the American Sweet chestnut. A good many people are asking me from time to time what the merit is in those large chestnuts. Invariably they have found that the quality is not as good as in the American sweet chestnut. I have been assured and Mr. Reed says that the kernel of these is very good. I wonder if there are some of them better than others—of the very large chestnuts.

Mr. C. A. Reed: There is a difference. The Boone that Mr. Olcott refers to is a cross between the American species and the

Japanese. The Japanese has not a good flavor; it is considerably below that of the American; but the Boone is quite good; but there are some of Mr. Riehl's chestnuts that are better. Mr. Riehl's are believed to be the pure American sweet chestnuts and some of them are very good, perhaps not quite as sweet as our American sweet, but they are exceedingly satisfactory and very popular in the Chicago markets where Mr. Riehl's chestnuts are going.

Mr. Bixby: This fall I received a chestnut which I am satisfied was Japanese, which is very large, and seemingly about as sweet as the American. I did not have the American there to test it by, but it was very interesting to me, and I am planning to get scions in the spring to follow it up further. It was seemingly a Japanese chestnut, and pretty nearly as large as the Boone.

Mr. J. F. Jones: I might say that so far as I have tested them, some of the Japanese are quite sweet, but the meat is generally tough, not brittle and sweet like the American.

President Reed: I believe Mr. Linton is with us, and we shall be glad to hear from him.

NUT TREES FOR HIGHWAYS AND PUBLIC PLACES

William S. Linton, Saginaw, Michigan

For a number of years it has been a source of gratification and pleasure to me to be identified with the membership of the Northern Nut Growers' Association. True, "a long distance membership only," but nevertheless a connection that all must admit has borne fruit, or nuts, as you may prefer to state it.

To this association and its official journal must be given full credit for the pioneer work in a great and good movement that will sweep, not only over the United States, but over every clime and country in the world's Western hemisphere as well. Your seed sown in the peninsular state of Michigan, was the first to sprout in a substantial way in so far as public planting of nut trees by a sovereign state is concerned, and it was our good fortune to have as staunch supporters for the plan such able and persistent workers as my good friend, Senator Harvey A. Penney of Saginaw, Professor A. K. Chittenden of the Michigan Agricultural College, and last, but not least, Honorable Frank F. Rogers, Michigan's excellent State Highway Commissioner. Upon the latter will largely devolve the duty of carrying out the law's provisions, as provided in Senator Penney's bill passed at the last session of the Legislature, and that it will be well and practically done, goes without saying.

And now to my theme, "Should the Country Roadsides be Planted and Why." The present high cost of living, and in fact the cost of living at any time is a fruitful and serious problem. Our vast natural resources during the century gone, of forests, of game, and of grazing lands, have almost to the point of extinction been rapidly passing away, and it behooves us, who have profited thereby and now owe a duty to our race to artificially provide wherever and whenever we can for the future of humankind. In what better way can this be done than in utilizing the immense acreage of America's vast system of highways, (now absolutely wasted except for the sole purpose of travel), to reproduce the very finest of our country's magnificent trees, to again afford beauty, grateful shade, valuable timber and the choicest of food in great abundance for the generations to come.

Were this not a convention devoted to the advancement of nut growing alone, I would be glad to extol also for road planting fruit trees of every kind of adequate size and character, and free or nearly so, from the ravages of disease or insect pest, would be glad to praise the stately, hard maple with its clear, sweet sap, producing the syrup and sugar that are the delight of childhood and age, and would be glad to recommend the useful basswood with its valuable lumber and its fragrant yellow flowers, producing that nectar from which our most delicious honey is made, and would be glad to recommend for our highways, certain other majestic trees needed by man and beautiful in the landscape.

But the object of this association and convention is a specialized one, as undoubtedly it should be, owing to the important field it covers, and therefore the nut trees and it alone for planting on highways and in public places should be the subject of this paper.

If we were to confine ourselves to one native variety or species for our Northern territory, the great majority of people would unhesitatingly say, let it be the Black Walnut *(Juglans nigra)*. Attaining as it does a height of 100 feet and more, and a trunk of four feet and over in diameter, with a symmetrical top of splendid foliage, bearing the richest of nuts and its timber the most valuable in the country, with a natural range extending from Michigan to Mississippi and from Delaware to the Dakotas, it should be universally planted throughout the United States along thousands of miles of our great trunk line roads.

Its nearest American relative, the butternut *(Juglans cinerea)* preferring lower lands along river bottoms, attaining an average height of 60 feet with a trunk of 3 feet, its wood suitable for cabinet work, its bark with medicinal properties, and its nuts of splendid flavor, should be planted where soil conditions call for it.

For their rich, delicious nuts, alone, saying nothing about their clean, handsome foliage, their rough, strong wood—the best of any grown for many purposes—the hickories, among which are the Shagbark *(Carya ovata)* and the big shellbark *(Carya laciniosa)*, should be planted in many places. They both frequently attain 100 feet in height with straight sturdy trunks averaging from three to four feet in diameter.

The other nut trees suitable for roadside planting, are not specially attractive to mankind for their fruits, as heretofore used or utilized, but may eventually become so under modern methods of cooking or proper treatment. In their raw state, however, all are edible and also palatable to most people, but their chief food value today, is to provide rich provender to domestic animals and birds, or the desirable wild life of the woodlands, all of which devour them eagerly, adding quickly to their weight and greatly to their quality and flavor of their flesh. I refer to the three magnificent oaks producing sweet acorns, viz., the White Oak *(Quercus albaQ*, the Bur Oak *(Quercus macrocarpa)* and the Swamp White Oak *(Quercus plantanoides)*. They are all emblematic of great strength and grandeur, reaching the majestic height of 100 feet ,with trunks four or five feet in diameter; the leaf coloring at times is indescribably beautiful and the timber owing to its great solidity and strength is of the utmost value.

Last, but not least, the American beech, with a three or four foot trunk and almost 100 feet in height, distinct and beautiful, will demand the attention of those who plant our highways. Its nuts, feasted upon by many forest denizens, may be classed with the sweet acorns heretofore referred to, but the tree has a grace and charm all its own and it thrives from the warm waters of the Gulf to the icy shores of Lake Superior.

At this time we cannot recommend what has been a noble, almost fascinating tree, 100 feet its usual heighth and sometimes spreading 100 feet almost in extent, with a trunk that in some cases reached a diameter of 10 feet, with clusters of golden catkins fragrant in midsummer, resulting in great quantities of delicious nuts in autumn. Such was the chestnut, *Castanea dentata,* of the past, the fate of which, and almost extinction, has been a tragedy in the ranks of our native trees that has brought bitter regrets to all lovers of this partician of the forest. Good news comes from the far East, however, to the effect that some specimens of this famous tree have escaped or proven immune to the blight, and if the latter, it means the saving of the species and its replanting in soil and territory where it may thrive as of yore.

Having now enumerated the varieties of trees that should be selected in the main for the planting of highways and in public places, the question now arises as to the best method of carrying on the work in a practical way throughout the country.

Individuals or small communities certainly can not be depended upon to do it, as the result would be of a patchwork character that would not be pleasing to the eye or beneficial in its results.

Only federal, state and municipal governments can take charge of this great work and carry it forward to completion.

The State of Michigan, now as you know, by legal enactment, causes state authorities to plant the trunk line highways, the county to plant the roads of the county systems, and the cities and villages and townships those minor roads that are within their borders.

In case of individual effort, where an owner of land plants food-producing trees along the highways in front of his property, he is reimbursed by stated amounts covering each tree so planted, the returns coming to him by a reduction in the amount of his own taxation.

This so-called Michigan plan carried on throughout the entire country, would call for a supply of trees of the character named far beyond the ability of the commercial growers to supply, and in my opinion can be worked out only by seed or seedlings of the various varieties. And why not? The cost would be much less than of any other method, and only a few years would pass before substantial returns would commence to come. It has been stated and it is true, that the seeds of the trees named do not always produce superior nuts, but in a great majority only those of a common or inferior kind. However, choice specimens will appear also, and from these of the better class grafting may be done to enrich all.

Then again, it is a question as to whether the important tap roots of the important nut species should be disturbed or destroyed in transplanting. It would seem to be the proper plan, therefore, in order to avoid too great an expense, that the nuts or seed should be used in a great majority of highway planting, the trees to remain where first placed on approved roadside lines, and the proper distance apart.

It may be said that too great a time would elapse between the planting of the seed and the maturity of the tree, but as time goes nowadays, it would not be an unreasonable period, and there are those within the sound of my voice now, who will witness in their maturity the magnificent trees producing their valuable products and adding to the beauty of the landscape and to the welfare of mankind.

This Association has been the pioneer in this great movement, and it will be the credit to those connected therewith in the generations to come, in that they have all contributed in a very marked degree to the everlasting benefit of mankind.

President Reed: Is there any discussion?

Mr. C. A. Reed: I believe Senator Penney is to discuss a topic very closely affiliated with this one and perhaps it would be well to defer the discussion until we hear his address.

President Reed: We will be glad to have Senator Penney present his paper next, then. It is along the same lines—legislation in regard to tree planting.

Senator Penney: When my friend, Mr. Linton, started off to discuss his paper, he said he was a long distance member, and you can see the effect in the fruits he has borne or the nuts he has borne. Ever since I was taken sick up north, he has been trying to tell me I was a nut. I was taken sick up there in the deer hunting camp, and my friend, Mr. Linton, assisted in getting me out and rushing me to the nearest hospital, and it happened to be an insane asylum in northern Michigan.

LEGISLATION REGARDING THE PLANTING OF NUT AND OTHER FOOD PRODUCING TREES

Senator Harvey A. Penney, Saginaw, Michigan

I wish to express my hearty appreciation to your Association for the distinct honor of being invited to address your meeting upon the subject of "Legislation Regarding the Planting of Nut and Other Food Trees." I believe that my invitation came as a result of having been responsible for introducing a tree-planting bill in the Senate of the 1919 session of the Michigan State Legislature, and later in securing its passage.

This bill purported "to regulate the planting of ornamental, nut-bearing and other food-producing trees along the highways of the State of Michigan, or in public places, and for the maintenance, protection and care of such trees, and to provide a penalty for injury thereof, or for stealing the products thereof".

For several sessions of the Michigan Legislature prior to 1919, bills had been introduced intending to accomplish this result, but each time heretofore they have regularly failed to pass. This fate included one introduced by the writer during the session of 1917. I am now fully convinced that none of these bills, although a step in the right direction, seemed to provide the proper working machinery or necessary features to put them into practical operation, and hence did not appeal to the legislative committees, nor to the members of the several legislatures.

During the regular session of 1919, with the valuable assistance of Hon. W. S. Linton of Saginaw, a new bill was prepared providing an entirely new method of supplying and planting such trees, and for putting such a law into effective operation under the jurisdiction of the state. It was made to work in harmony with the rights of the property owner adjoining the highway, and with the duties of those state officials whose departments were perfectly adapted and equipped for putting the law into active operation.

I am going to attach an enrolled copy of the tree planting bill at the end of this paper, so that it may be made a part of the permanent records of the Association. It will therefore be unnecessary to give a detailed account of all the provisions contained therein.

I will, however, mention a few of the principal points so that you may understand its purpose. It provides that the Public Domain Commission which has charge of the state forest reserve lands and parks, together with the Michigan Agricultural College, are given authority to grow and acquire suitable seeds, scions or trees for planting under the provisions of this act. A department of the Agricultural College determines the kind of trees which are adapted or suitable for planting in different soils or places. In order to insure a uniform system of planting, this duty is left to the State Highway Commission and the State Board of Agriculture, acting jointly. The trees belong to the state, but the nuts or other products belong to the owner of the land adjoining the highway. A penalty is imposed if these trees are defaced with advertisements or signs, and neither can they be cut down or destroyed.

But just as you find legislatures differing in their opinions upon public matters, so you must expect them to differ more or less upon the feasibility of most any bill that is presented for their consideration. All kinds of arguments are made for and against any bill. I remember that one Senator in the committee thought that trees planted along the highways bearing nuts or fruit would constantly be subject to a lot of tampering and molestation by the traveling public. But another Senator came back with a reply that seemed to be very convincing, when he stated that he had a fine row of cherry trees growing along the front of his farm, and had never experienced any trouble of that kind from such a source.

I have always felt that if the merits of a good bill were properly explained to a legislature committee, there will be no hesitancy in having it favorably reported out and finally passed. I believe the legislature of 1919 took this view of the tree planting bill introduced by myself, as it was passed by both the Senate and the House, and later received the signature of Governor Sleeper, thus making it an established law of Michigan.

I must not forget to mention the fact that after this bill had been passed by the legislature and still needed the signature of the Governor to make it a law, a number of Michigan's representative and influential citizens wrote to Governor Sleeper, urging him to affix his signature thereto. Among those was Dr. J. H. Kellogg of Battle Creek, who has more than a nation-wide reputation in his profession and is at present a strong factor in the success of this association.

This law is intended not only to ornament the public highways of Michigan, but also to furnish nut bearing and other food-producing trees that should assist materially in the problems incident to the high cost of living. It would seem that such a law should be duplicated in every state where practicable, and also be promoted by the National Government upon National Highways.

The people of Michigan recently voted to amend the State Constitution so as to permit the issuance of $50,000,000.00 worth of bonds for the improvement of public highways. By the time that this large sum has been apportioned over a period of say ten years, and the road moneys furnished and expended during this time, as federal aid by the federal government, local counties and townships are added thereto, it has been estimated that the vast sum of nearly $200,000,000.00 will have been used solely for the improvement of our state highways .

With a wonderful highway system thus established, beautifully adorned by the state with nut-bearing and other trees, the roads of Michigan should become a great attraction in which our citizens would not only have a just pride, but serve as a model of excellence for the whole nation to imitate.

Mr. C. A. Reed: Mr. President, I would like to ask the Senator what danger there is likely to be in the protection of these trees when they are once planted. Is the tree going to have right of way, or is the telephone company going to have right of way in cutting out the top; or is a new bred consciousness going to have authority. If it is possible that the trees will be destroyed as many have been, perhaps the legislation may be changed in some way. Suppose we want to give them good care, what are we going to do?

Senator Penney: The law has a section in it providing for defacing and damaging the trees or cutting them down. I have a copy of the bill there. As my throat is in bad shape perhaps it might be well to have the secretary read the bill. It is not very long.

Mr. Linton: In this connection I would also ask for the reading of the bill by the secretary. This is a bill that may be copied by other states throughout the Union, and if there is any criticism that is just, in reason, for changing any of the features in the bill, they should be decided upon at this meeting or by a committee. Because a uniform bill throughout the country is really something desirable, I think, in connection with this legislation. And I would add further: Michigan does not have an entire monopoly of Highway legislation at the present time, but is in a prominent position in connection therewith. The chairman of the committee on post offices and post roads of the United States Senate is Senator Townsend, of this State. It is his bill that will cause the national highways to be constructed from ocean to ocean. Senator Townsend is one of our best beloved citizens; his heart is in this work; and I am sure from what I know of him (and he is a close friend of mine) that he will enter heartily into the spirit of embodying in national legislation something of the character that we have in state legislation in Michigan so that it may apply to the whole country as well. And for that reason I would like to have the bill read. It is a short one, and any additions or any amendments thereto I know will be gladly received by Senator Penny or myself.

Mr. Olcott: Mr. President, I think that is one of the most important subjects that can come before this Association; not only that, but the interest of every member should be enlisted particularly in this subject. The possibilities of the extension of that work are almost unlimited and directly in line with the objects of this organization.

PRESIDENT REED: I am just wondering whether we would have time to have it read now, or postpone it to a little later. Dr. Kellogg is with us now.

MR. BIXBY: This bill is very short. (Read bill.)

Senate Bill No. 59 (File No. 150) Introduced by Senator Penney

STATE OF MICHIGAN
50th Legislature
Regular Session of 1919
SENATE ENROLLED ACT NO. 18

An act to regulate the planting of ornamental, nut bearing or other food producing trees along the highways of the State of Michigan, or in public places, and for the maintenance, protection and care of such trees and to provide a penalty for injury thereof, or for stealing the products thereof.

The People of the State of Michigan enact:

Section 1. The State Highway Commissioner and the State Board of Agriculture, acting jointly hereunder, shall have authority and it shall be their duty to select and plant, by seed, scions or otherwise, ornamental, nut bearing, or other food producing trees, (to be supplied by the Public Domain Commission, or the Michigan Agricultural College, as may be recommended or approved by the Division of Agriculture of said college,) suitable for shade trees, along the State trunk line highways and all other highways of the State of Michigan, upon which State reward has been paid or earned:

Provided, that in no case shall such trees be planted except by and with the consent of the owner of the property adjoining such highway. The State Highway Commissioner shall establish rules and regulations for uniform planting or proper placing of all trees under the provisions of this act, and all such trees shall belong to the State, but the products thereof shall belong to the owners of the adjacent land. Nothing herein contained shall authorize the State Highway Commissioner, or the State Board of Agriculture to cut down or interfere with shade trees now growing along any such highway, without permission in writing from the owner of the adjoining property. All expenses incurred in carrying out the provisions of this section shall be paid out of any moneys in the State highway fund that may be available therefor.

Section 2. Counties, townships, cities and villages may annually appropriate money to be used in planting, pruning and protecting, and whenever necessary in acquiring shade, nut bearing and ornamental trees to be placed along and within the respective limits of said municipalities. The expenditure of any such fund shall be vested in the highway commissioner in the case of county roads, and in the proper highway authorities of the city or village as the case may be.

Section 3. The owner of any real estate in the State of Michigan that borders upon a legal highway upon which State reward has not been paid, shall have the right to plant said approved ornamental, nut bearing, or other food producing trees along the line of said highway adjoining said land, and shall receive annually a credit of five cents upon his highway repair tax for each tree so planted by him and growing in good order, not less than six feet in height when planted and not less than twenty and not more than forty feet apart. All of said trees and their products shall belong to the owner of said land: Provided, that no bounty shall be paid or deduction allowed under the provision of this section upon any one tree or row of trees for a longer period than five years. The owner of such trees shall have the care thereof and shall have the duty and responsibility for the trimming, spraying and cultivation thereof.

Section 4. The Michigan Agricultural College and Public Domain Commission are hereby authorized to grow and acquire suitable seeds, scions or trees for planting under the provisions of this act, and to establish proper rules and regulations for distributing the same at nominal cost, or otherwise, to counties, townships, cities, villages, and citizens of the State for the aforesaid purpose, and also for State parks or other public places.

Section 5. It shall be unlawful to cut, destroy, injure, deface or break any ornamental, nut bearing, food producing or shade tree upon any public highway or place, except where such trees shall interfere with the proper construction or maintenance of such highways. It shall be unlawful to affix to any such tree any picture, announcement, play-bill, notice or advertisement, or to paint or mark such tree, except for the purpose of protecting it, or to negligently permit any animal to break down, injure or destroy any such tree within the limits of any public highway. Any person violating any of the provisions of this act shall be guilty of a misdemeanor and on conviction thereof shall be punished by a fine of not less than one dollar or more than twenty-five dollars, and in default of payment of any such fine may be imprisoned in the county jail for a period not exceeding thirty days. Such person shall be liable to the owner of the trees for treble the amount of damages sustained.

Luren D. Dickinson,
Lieutenant Governor, President of the Senate.

Tom Reed,
Speaker of the House of Representatives.

Approved, March 28, 1919.
Albert E. Sleeper,
Governor.

Mr. C. A. Reed: Mr. Chairman, I move that before adjournment the chairman appoint a committee of three members of this association to carefully review this bill and either report in favor of any suggestions that they may wish to make in regard to its amendment or give approval of the bill as it stands.

Mr. Linton: I support the motion.

President Reed: It is moved and seconded that the chairman appoint a committee of three to carry out the recommendations. All in favor say Aye; contrary, No. It is Carried.

Senator Penney: That law is adjusted to the laws of Michigan and any other state proposed would have to adjust it to fit their laws.

President Reed: I would like to have Mr. C. A. Reed on that committee, Mr. Olcott and Dr. Morris.

C. A. Reed: Then, Mr. President, in addition to that we are going to take the liberty of adding an *ex officio* member. Mr. Littlepage, an ex-president and also a good thoroughgoing nut.

Mr. Jones: My understanding is the provision for six-ft. trees. Six foot nut trees unless they have been transplanted several times will hardly succeed. I would say use small trees along the highway.

President Reed: I think that would need to be worked out. I think a six foot tree is a little dangerous in some varietiese. The committee might find it wise to offer some suggestions in that line.

Voice: If you plant a tree six feet high, you are sure of having a tree there.

President Reed: I believe Dr. Kellogg is about ready now, and we will hear from Dr. Kellogg whom you are all acquainted with.

THE SOY BEAN

Dr. J. H. Kellogg, Battle Creek, Michigan

It is evident that the live stock industry is shriveling up. The livestock inhabitants of the country—the pigs, sheep and cattle—are much smaller in population at the present time than they were twenty-five or thirty years ago, and are getting smaller all the time. The price of meat is high and is going to continue to climb. It is away out of reach of the average laboring man even at the present time. I heard Dr. Charley Mayo say at a clinic not long ago that meat is so high he could not afford to eat it and he didn't see how anybody could; and as a matter of fact, he didn't need it anyhow, and so we could easily get along without it. As a matter of fact, as Mr. Bill said some years ago it is not really so much the high cost of living as it is the cost of high living; and the use of meat is such an extravagant and expensive thing it is very important that people should know how to get along without meat.

The experimenters of the agricultural experiment stations have shown us that it takes thirty-three pounds of dry digestible food substance to make one pound of beef—31 or 32 pounds to make a pound of beef, and 33 or 34 pounds to make a pound of mutton. Seven pounds of digestible food substance will make a pound of dry milk. So we can readily see that there is an enormous waste of foodstuff. Only about ten per cent of the corn raised is used for feeding human beings. The rest is fed to animals and a large part of it is wasted.

So it is exceedingly important, it seems to me, that this nut industry should be encouraged in every way. A half million acres of nut trees well advanced and producing would produce all of the fat and more digestible fat, and all the protein and more digestible protein, than we are now using in the entire country. We are producing more than enough food in corn and other foodstuffs to feed nearly three times our present population, and most of it is wasted in the energy which the hog, the steer and other animals use up in running around and keeping warm. That is where the great loss comes. In nuts we have a choice foodstuff as digestible as any other foodstuff, and Prof. Torrey and Prof. Mendel and others who have recently made experiments have shown that the protein of the nut and the protein of vegetables in general is not so putrescible as the protein of meats. There are good reasons for it. It does not undergo putrefaction so readily any way, and besides meat carries along with it the bacteria which produce putrefaction.

Meat is the filthiest thing that goes upon our tables. If the number of bacteria in milk was as great as the number of bacteria in meat, nobody would think of eating it. If the bacteria in water were as numerous as in milk, no one would be willing to drink the water. It is a very curious thing that we permit in milk and in meat a condition of things we would not tolerate in air or water for a moment. Every morsel of meat a person eats contains some billions of the bacteria of the very worst sort. Bacteria found in meat are those which produce colitis, appendicitis, abscesses of the teeth and diseased conditions of the tonsils. They predispose to a good many infectious diseases of the intestine, and no doubt predispose to cancer. It is pretty well established at the present time that cancer is a disease of meat eating men and animals. About one cow in fifty has cancer, whereas every seventh dog taken to a hospital sick is found to have cancer. Dr. Mayo recently gathered some statistics on this matter, and he told me and some other doctors that dogs under eight years of age, every fourth one has cancer; every third one of dogs ten years of age has cancer, and half of all the dogs over twelve years of age have cancer and would die of it if left to themselves. These statements were based on laboratory animals that were killed when they were well and not sick, so the observation ought to be fairly reliable.

I was to say particularly a few words about the soy bean. I am not going to try to tell you very much about it, because I do not know very much about it. If you want to learn all about it, you can easily do so by writing to Mr. W. J. Morse, of the Bureau of Plant Industry, U. S. Department of Agriculture, Washington, D. C. Farmers' Bulletin 973, one of the very best on this subject, tells all about the culture of this exceedingly useful legume. The soy bean is really the beefsteak of China and Japan. In those oriental countries, soy beans have been used for centuries. It is more nearly like a nut than a bean. Perhaps I better show you the pictures first, and then have the curtains raised so we can get a better inspection of the beans.

The composition of the soy bean is very remarkably different from that of the ordinary bean. It contains forty per cent of fat, on the average and about forty per cent of protein—sometimes more than forty per cent. The protein is sixty per cent more than in our best ordinary foods; and the fat is five or six times as much as that found in the ordinary bean.

A thousand different varieties of the soy bean have been gathered by the Bureau of Plant Industry of the Department of Agriculture at Washington. Five hundred of these varieties have been tested, and thirty or forty of them have been found to be adapted to this country, and very useful. You can see in this picture the great mass of pods to be found growing on the plant. This slide shows how unusually well they grow in the field. You can see the pods scattered all through the plant. A large part of the foliage is made up of pods. This is one of our own fields of the beans that we raised this year. It is rather difficult to raise the bean in this latitude, because it requires a long time to mature. It requires about 140 days for some varieties. We have, however, a variety we raised here that we got from the agricultural department of Ontario. We found it matured very well indeed in 120 days. We planted the bean here the first week in May and harvested it the first week in September; so its season was about 120 days. I found this particular bean was new to the agricultural department at Washington, and have sent them some of the seed, and I think they are going to make some trial of it.

This is a view of a field of the Hahto variety which is a particularly fine variety for use as a shelled bean. In China the soy bean is very little used as we use beans. They do not cook the bean and eat it as we do; but instead they make it into a cheese which they call tofu, and this cheese is made by soaking the beans, grinding them into a pulp, then boiling for ten or fifteen minutes with about five volumes of water; then the milky mass is precipitated with sulphate of magnesia or citric acid, a very small amount because they use it as a curd. I have here a sample of the curd which I will pass around in a moment for you to see. This picture shows this curd pressed in large cakes. The soy bean curd is stored on wooden trays in a dark room. It is also stored in large earthen jars. They cure it and make cheese out of it which very closely resembles our American milk cheese. They also use the beans for sprouting.

The bean lacks only two things. It lacks lime and the fat-soluble vitamines. It contains a considerable amount of the fat-soluble vitamines. It is one of the very few seeds that is found to contain a sufficient amount of the fat-soluble vitamine to promote growth, so that animals will grow and develop normally on the bean alone without any other sort of fat-soluble vitamine. If the bean is sprouted, a large amount of this fat-soluble vitamine is produced by the plant itself. This is also found to be a valuable means of preventing scurvy—by sprouting the beans in this way and using the sprouts as a salad, The sprouts are used as a green vegetable. It is an easy way of getting green vegetables at any season of the year. It takes the place of ordinary greens.

Here is a courtyard full of pots in which the fermented soy beans are placed. This is a very interesting scheme they have for making a substitute for meat extract. By this means they prepare an extract which closely resembles extract of beef. In fact, it is rather a finer flavored product than meat extracts. It is made by first cooking the beans, spreading them out in the yard on trays and allowing a fungus to grow, and after two or three weeks the whole mass is put into pots of brine in the yard and allowed to remain there for a year or more, and at the end of that time the brine has become soy sauce.

This shows a mass of soy roots. It has been suggested it might be very useful to nut growers as a means of fertilizing the soil, a crop which will fertilize the soil for the trees and at the same time give a valuable return for the labor and expense. The little nodules on the roots are very numerous and show well here. They produce nitrogen, concentrated nitrogen from the air as do the nodules on the roots of alfalfa. The *Scientific American* recently stated that the soy bean is one of the most promising of vegetables. It provides food for man and beast. Given enough soy beans and granted the art of preparing them so that they might be served as food having sufficient diversity and palatableness, neither meat nor fish nor fat would be needed. In this respect the Germans did not prepare for war. If they had had the soy bean industry well developed it might have helped them through, and the map of the world might have been seriously changed from what it now is.

I think one of the finest of the soy beans is the Hahto variety. They grow one or two in a pod. I saw some of these beans in the market in Jerusalem forty years ago. When about three quarters grown and used as shelled beans they are exceedingly palatable. If at the dinner table today you will call for a soy bean omelet, you will be quite surprised. Dr. Morris tried it this morning and was kind enough to say it was the finest he ever ate.

The soy bean is the best of a large part of the cookery of the orient. We have been introducing it here the last few months, and it is very palatable, very digestible, and our patients like it very much. If you are interested in the soy bean, write to W. J. Morse, or to the Agricultural Department, Bureau of Plant Industry, and they will give you a lot of interesting information about it. In starting the planting of the bean, it is necessary to inoculate the soil as in the starting of a planting of alfalfa.

PRESIDENT REED: Mr. Bixby has prepared a paper on "Judging Nuts" which there is not now time for him to read. It will be inserted in the proceedings at this point.

JUDGING NUTS

WILLARD G. BIXBY, BALDWIN, NASSAU CO., N. Y.

That there are differences in nuts is apparent to everybody. The selecting of the best nuts out of a lot of two or three usually presents no difficulty, and, when the number of nuts to be judged amounts to a dozen or so, it is generally possible to pick out the best, but, when one has before him nuts from several hundred trees, the problem becomes a very different one, and the person who tries to pick out the best from such a lot soon becomes aware of his own limitations. If, in addition, he has sufficient respect for consistency to try to be so exact in his judgment as to be able to go over a large lot of nuts today, we will say, and several months hence go over the same lot again and render the same verdict on each one of them, he will doubtless give the matter up as an impossibility, and yet that is just what is wanted and expected of those who judge the nuts which are sent in to the annual contests, which contests have resulted in bringing to the attention of the nut growing world the nuts of so many fine trees.

The experience of the last two or three years in being one of the judges who passed on the nuts which were sent in to the contests convinced me, almost at the start, of the desirability of getting methods where it would be possible to go over a large lot of nuts now and several months hence, and render the same verdict on each one of them, but now how to do it was not at first apparent, and the methods for doing it which will be outlined are the results of much work, many attempts, and the discarding of many of the methods tried.

Considering the methods used in judging fruit, animals and fowl has helped to some extent, but this assistance did not go far. The beginning of improved methods of judging any of the above, is the establishment of a score card, as it is called, which is nothing more than an enumeration of the characteristics and a decision as to the relative value of each one. Usually the values assigned to each characteristic are such that when added up the total will be 100 points. Score cards of this character are in general use.

The first attempt to make a score card for use in judging the nuts to which the Northern Nut Growers' Association gives its attention, so so far as I am aware, was that of a committee of the Northern Nut Growers' Association, which reported at the Fifth Annual Meeting at Evansville, Ind., 1914, and which report will be found on page 20 of the report of that meeting. Prof. E. R. Lake was chairman of the committee. The score card for butternuts, black walnuts and hickories which it recommended is noted below:

General Values	Points	Kernel Values	Points
Size	10	Color	10
Form	5	Plumpness	5
Color	5	Flavor	10
Shell Values		Quality	20
Thinness	15		—
Cracking	20	Total	100

This score card has served as a basis for all the work that has been done in judging nuts since that work has largely fallen to me. It was early found desirable, however, to change the score card in one or two respects, and it has since been changed two or three times as the experience gained in judging nuts saw it was desirable. The score card now in use is noted below:

General Values		Cracking Quality	20
Weight	10	Kernel Values	
Form	5	Color	5
Color	5	Proportion of kernel	20
Shell Values		Quality and Flavor	20
Husking Quality	5		—
Thinness	10	Total	100

The first time one attempts to judge a large number of nuts whether with the aid of such a score card as that proposed by Prof. Lake's Committee or without it, he gets into practical difficulties at once.

These difficulties are not with the score card but in its use. Take for example the characteristic, size, the first one on Prof. Lake's score card. How can a person tell from the nuts of a hundred hickory trees which is the largest and which is the smallest and which are intermediate; in short how can he arrange them in order of size, the largest at one end of the line and the smallest at the other with a uniform graduation in between. Anyone who tries to do such a thing quickly finds that it is impossible to do this correctly if one has only his eye to aid him in determining size. The inability to do so quickly becomes apparent if a person tries to arrange such a lot of nuts in order of size at one time and then several days later tries to arrange the same lot of nuts in order of size again. It is almost certain that they will not get arranged the same both times. The differences between the nuts are usually so minute, and, what is more important, the difficulties of correctly estimating size by the eye alone are so great that it is practically impossible to do it. An expert on this point can do it of course much better than one who is not, but even the expert is only too well aware of his limitations and of the impossibility of properly doing the above. The same difficulty is apparent with every characteristic on the list and while judging by experts with the aid of a score card, is, so far as I am aware, the method used in judging fruit, farm animals, poultry, etc., the crudeness of this method is only too evident to the experts themselves. Two or three years ago it seemed very far inferior to what actually measuring these characteristics would be, although such measurement at first seemed difficult, not to say almost impossible. Much work has been done on this, and it is very gratifying to say that this measurement has been found possible to an extent that was not dreamed of before the work was started. Before outlining the methods worked out to do this a little discussion will be given on Prof. Lake's score card, the characteristics which it pointed out, and the reason shown for changing some of them.

Size is a characteristic which is apparent to everyone, yet the actual measurement of size in the case of a large lot of nuts presents difficulties which seem practically insurmountable. A serious attempt was made to measure the length, breadth and height of the nuts examined and gauges were made which should do this exactly and quickly. These were finely discarded and the characteristic "weight" adopted in place of size. This has to quite an extent replaced size in considering farm products. When we used to buy potatoes by the bushel we used to get a bushel basket full, now we get the legal weight of a bushel of potatoes and instances of this kind might be multiplied almost indefinitely. While weight and size are not exactly the same thing, yet they are so to a large extent in the case of a given commodity, such as nuts of one species, and weight can be accurately and rapidly determined.

Plumpness is another characteristic which we all understand as far as the difference between a nut with a plump well filled kernel is concerned, and one with a shriveled up kernel, but when it comes to arranging the kernels of a lot of nuts in order of their plumpness, the one who tries to do it becomes ready to give up before he really gets started. It was found that the ratio of the weight of kernel to the weight of the entire nut which is termed "proportion of kernel" was never large in the case of a nut with shriveled kernel. It was small in the case of a nut with a thick shell and a plump well filled kernel, but, as stated above it was never large in the case of a nut with a shriveled kernel and a good deal of work on the subject convinced me that the characteristic "proportion of kernel" could be very well substituted for plumpness.

There seemed at the present time little use for separating flavor and quality as there seemed to be some question as to what was intended by the terms separately and so they were considered together. I would like to state here that little consideration has so far been given as to whether the number of points awarded for each characteristic are such as to cause the nut that will ultimately be considered of most value commercially to get the first prize or not. The score card of Prof. Lake's seemed so good that it was thought far more important at present to develop methods of measuring these characteristics. A careful study of the nuts sent in to the contests, it was thought, would point out most parts of the score card where improvement could be made, and this has already proved to be so to a considerable extent. The methods of quantitatively measuring the different characteristics and determining the number of points to be awarded for each will be outlined one at a time.

WEIGHT: This is determined by an accurate scale, one weighing to 1/10 gram was used, and the same scale was used directly or indirectly for determining six out of the nine characteristics considered. In determinining weight, five average nuts (as far as could be determined by appearance) were weighed and the average weight determined. Having at hand the weights of the largest and smallest nuts of the species under examination, the largest nut was awarded 10 points and the smallest 0 and the nuts of intermediate weight were awarded intermediate figures. The method of doing this will best be seen by taking a specific instance e. g. the Lutz black walnut, the average weight of which is 26.4g. The Alley black walnut, the average weight of which is 10.0g is the smallest good black walnut which has come to our attention, while the Armknecht black walnut which weighs 28.9g is the largest one of which we know. The Armknecht black walnut would be awarded 10 points for weight and the Alley 0 points and a table would be made up for use in determining the number of points to be awarded for intermediate weights as noted below:

BLACK WALNUTS—WEIGHT

Heaviest Armknecht 28.9 grams; Lightest Alley 10.0 grams.

Weight of nut.	Points.
28 grams and less than 30 grams	10
26 " " " " 28 "	9
24 " " " " 26 "	8
22 " " " " 24 "	6
20 " " " " 22 "	5
18 " " " " 20 "	4
16 " " " " 18 "	3
14 " " " " 16 "	2
12 " " " " 14 "	1
10 " " " " 12 "	0

After the average weight of five nuts of a given variety has been determined, an inspection of the table shows at a glance the number of points to be awarded for weight, which, in the case of the Lutz Black walnut, is 9. In case a nut should be entered which was very much larger or smaller than provided for, the table can be extended for use temporarily. The table, however, should be revised before being used the next year. For example, had a nut come in weighing 30.5 grams this might have been awarded 11 points, and had one weighing 8.5 grams come in this would have been awarded -1 point in order to give each nut full credit, for excellence in size or to penalize it for lack of it. It will be noticed that by the method outlined the size of a nut is determined exactly and the same number of points for size (or weight) would be awarded today, next week, next month, or next year, barring of course real changes, e. g. those caused by actual loss of moisture, etc.

FORM: It was only recently that a method of measuring this characteristic has been suggested and this has been tried out only experimentally. By form is meant attractive appearing shape which has been held to be absence of hollows, ridges, angles, etc. A round, smooth nut would be held to have perfect form in distinction from nuts that are rough and full of ridges or edges. The only method of measuring that has been suggested and which it is believed will work out satisfactorily is to first select an average nut and weigh, then fill up the hollows in the surface of the nut with wax just covering the ridges till the surface is smooth, and weigh. This will give the weight of the nut plus the weight of the wax needed to fill up the hollows on the surface. As the specific gravity of the wax is 4/5 that of the nut the figure actually used is weight of nut plus 5/4 weight of the wax, which gives the weight of a nut of the size of the sample with the hollows in the shell filled up or the weight of a nut of perfect form of the size of the sample. The measurement of form is then the weight of the average nut divided by the weight of a nut of the same size of perfect shape, that is without hollows or ridgese.

A measurement of form of a black walnut gave the following:

Weight of nut	22.5	grams
“ “ “ and wax	24.6	“
“ “ wax	2.1	“
“ “ 5-4 wax	2.6	“
“ “ nut and 5-4 wax	25.1	“
Form	22.5÷25.1=89.7%	

When a nut has perfect form there will be no hollows to fill and no wax will be needed and the weight of nut and 5/4 of the wax will be the same as the weight of the nut and therefore its form figure will be 100%. The number of points to be awarded for any measurement of form would be determined by making up a table as was made up for awarding points for weight, but such a table cannot be made up till after an examination of form values for a large number of nuts. This will be done later.

Color: The color of shell was measured by making up samples of water colors of all gradations of color between the lightest shell and the darkest. From these, five were selected as showing in five steps the differences noted, the lightest being marked 5, the next 4 and so on down to the darkest which was marked 0. With these color standards in front of the one judging, it was only necessary to take the nut to be judged and lay it on the standards of color and the figure on the shade which the nut most nearly matched was the figure awarded for color.

Husking Quality: This represents the ease with which the husk can be removed. In view of the well known fact that husks of all nuts do not come off with equal facility the need of such is apparent. Its measurement will be the proportion of husk removed by a standard husking operation.

THINNESS OF SHELL: This was measured by providing a means for bringing two metal surfaces together, keeping them always parallel. The nut to be cracked was placed between these surfaces and an arrangement of scale levers provided so that the pressure exerted on the nut could be weighed. The surfaces were brought together till the nut was cracked and the pressure required was noted. This measures the thinness of the shell or more properly the strength of the shell, the weakest shell of course being the one that takes the least pressure to crack. This pressure was measured in kilograms for by doing so it was possible to utilize some stock apparatus. After the pressure required to crack has been noted a reference to the table below will tell the number of points to be awarded. We will take for an example the the same nut as taken to illustrate weight e. g. the Lutz black walnut whose average cracking pressure is 312kg and which therefore would be awarded 2 points for thinness of shell. In this connection it should be stated that this table would seem not to be made out on the plan followed heretofore by taking the thinnest shelled nut of which we know. the Alley, as the low limit of the table. While the Alley black walnut takes the least cracking pressure of any we know which we can identify as from a particular tree, one black walnut was cracked which I believe came from the Ten Eyck tree which had a cracking pressure below 80kg and hence the table was made of sufficient extent to include this. It is my intention to get additional Ten Eyck nuts this year and check the matter up.

BLACK WALNUTS—THINNESS OF SHELL

Weight required to crack: Thinnest, Alley 110kg: thickest. Triplett 348kg.

Weight in kg.	Points	Weight in kg.	Points
50 and less than 80	10	230 “ “ “ 260	4
80 “ “ “ 110	9	260 “ “ “ 290	3
110 “ “ “ 140	8	290 “ “ “ 320	2
170 “ “ “ 200	6	320 “ “ “ 350	1
200 “ “ “ 230	5	350 “ “ “ 380	0

CRACKING QUALITY: This characteristic is perhaps the one which seems to most people the most difficult to measure, but. while it was some time before methods of measuring it did occur to anyone, its measurement is effected very easily. In cracking nuts a part of the kernel will usually drop right out. some times it is a large part, occasionally all. and sometimes it is but a small portion. A perfect cracker is one where the entire kernel drops out after cracking. This would have 100% cracking quality. When 4/5 of the kernel drops out after cracking and the remaining 1/5 can be extracted only by recracking or by picking out, the nut is said to have 80% cracking quality. In other words, the cracking quality is the ratio of the weight of the kernel which drops out after cracking to the entire kernel. The operations of determining cracking quality in practice are first, selecting five average nuts; second, cracking them and weighing the part of the kernels which drop out after cracking; third, extracting the balance of the kernels and getting the weight of all the kernels; fourth, dividing the weight of the part of the kernels which drop out after cracking by the total weight of the kernels, and the result is the cracking quality. After an examination of the figures of a large number of nuts, the table below was made up from which the number of points to be awarded for any given cracking quality is readily obtained. Taking the Lutz black walnut as an example again we find that the weight of the kernels which dropped out after cracking was 24 grams while the total weight of kernels was 32.5 grams which gives a cracking quality of 73.8% which would be awarded 13 points for cracking quality.

Black Walnuts—Cracking Quality

Percentage of kernel that drops out after cracking.

Highest, Alley*, 100%; Lowest, Butler, 22.9%.

Cracking Quality.	Points
100%	20
96% and all higher percentages under 100%	19
92% and all higher percentages under 96%	18
88% and all higher percentages under 92%	17
84% and all higher percentages under 88%	16
80% and all higher percentages under 84%	15
76% and all higher percentages under 80%	14
72% and all higher percentages under 76%	13
68% and all higher percentages under 72%	12
64% and all higher percentages under 68%	11
60% and all higher percentages under 64%	10
56% and all higher percentages under 60%	9
52% and all higher percentages under 56%	8
48% and all higher percentages under 52%	7
44% and all higher percentages under 48%	6
40% and all higher percentages under 44%	5
36% and all higher percentages under 40%	4
32% and all higher percentages under 36%	3
28% and all higher percentages under 32%	2
24% and all higher percentages under 28%	1
20% and all higher percentages under 24%	0

Color of Kernel: This is determined in the same way as the color of the shell by comparing with a standard color scale, and the step of the scale whose color most nearly matches the color of the kernel being examined gives the figure to be awarded.

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* An additional lot of Alley Black Walnuts received several months after the one entered in the 1918 contest did not show 100% cracking quality.

Proportion of Kernel: This is the ratio of the weight of the kernels of five average nuts to the entire weight of such average nuts. After this has been determined a comparison with the table below which was made up after an examination of the proportion of kernel of a large number of nuts, the number of points to be awarded is readily determined. If we take for example the Lutz black walnuts again we find the weight of five average nuts 132.0 grams and the weight of the kernels of these nuts 32.5 grams which gives for the proportion of kernel 24.0% which would be awarded 8 points.

Black Walnuts—Proportion of Kernel

Ratio of weight of kernel to weight of entire nut (without husk).

Highest, Ten Eyck 36.4%; Lowest, Seefeldt, 16%.

Percent of Kernel.	Points	Percent of Kernel.	Points
36% and less than 37%	20	26% and less than 27%	10
35% and less than 36%	19	25% and less than 26%	9
34% and less than 35%	18	24% and less than 25%	8
		23% and less than 24%	7
33% and less than 34%	17	22% and less than 23%	6
32% and less than 33%	16	21% and less than 22%	5
31% and less than 32%	15	20% and less than 21%	4
30% and less than 31%	14	19% and less than 20%	3
29% and less than 30%	13	18% and less than 19%	2
28% and less than 29%	12	17% and less than 18%	1
27% and less than 28%	11	16% and less than 17%	0

Quality and Flavor: Absolutely no progress has so far been made in measuring this characteristic or more correctly these characteristics for, strictly speaking, there are a number of them instead of one and the only method available at present is tasting by experts. It is very much to be desired that methods for measuring this be worked out and several lines on which to work in order to accomplish it have been thought of but as yet no definite progress has been made.

While the characteristic as yet unmeasured is one of the most important and most difficult even for experts to estimate correctly when there are large numbers of nuts to be examined, the fact that it is possible to measure the other eight is a matter of a good deal of satisfaction and this satisfaction is the greater because with the methods that have been worked out it is possible for any ordinarily careful person to do the work about as well as it is for an expert and, as the work of judging a large number of nuts is very considerable, the elimination of a large part of the need for expert services is very gratifying. The services for example of such experts as Dr. Morris and Capt. Deming are obtainable only occasionally and for a short period. Now that the nuts sent in are rapidly increasing, it would have been impossible to have handled the contests without some improvements in the methods used.

While the same score card has been used for butternuts, black walnuts, and hickories it seemingly can be used quite well for English walnuts, Japan walnuts and pecans also, in short, for all nuts belonging to the botanical family Juglandaceae and perhaps for hazels. Separate ones will evidently be required for beech nuts, and chestnuts. The tables for determining the number of points to be awarded for a given value of any characteristic are likely to vary for each species. Inasmuch as there are fourteen species of hickories exclusive of the pecan that have to be considered and apparently even more species of walnuts not to mention beechnuts, chestnuts and hazels, one might think that nearly 100 tables would be required. A study of the matter, however, has shown that the number really needed is very much less, and the more that nuts are examined the more it seems possible to make one table answer for a number of species and have the number of points a nut receives indicate to a certain extent its value as a nut to grow, and not simply the value of a given variety of a certain species.

The hickories and the walnuts require a word in passing. There are at least nine species of hickory either native in the northeastern United States or that will grow there and it is quite possible that further study of the hickories will add to this number. Seven of these belong to the scale bud class, *Eucarya*, the shagbark, *Carya ovata*, the shellbark, *Carya laciniosa*, the scaly bark, *Carya Carolinae-septentrionalis*, the mockernut, *Carya alba*, and the close-bark pignut, *Carya glabra*, the loose-bark pignut, *Carya-ovalis*, and the pallid hickory, *Carya pallida*; while two belong to the open bud class, *Apocarya*, the pecan, *Carya pecan*, and the bitternut, *Carya cordiformis*. Hybrids between many of these species are found occurring naturally and seemingly hybrids between any two are possible, and the fact of many of them being hybrids is not evident on an inspection of the nuts. It is a noteworthy fact that quite a proportion of fine hickories that are being propagated are evidently hybrids and the number of our fine hickories which are evidently hybrids increases as they are studied more carefully. In many ways it would be desirable in the contest to offer prizes for the best nuts of each species of hickories, but the difficulty of determining the species from the nut alone, and the fact of such a proportion of our finest nuts being hybrids is sufficient to discourage the attempt. What was done in the 1918 contest, and what would seem to be the best thing that can be done is to offer the prizes for hickory nuts simply. Most of the prizes are taken by shagbarks but when a nut not a shagbark gets into the prize winning class, we make a class that would include it. For example, in the 1918 Contest, three shellbarks and one mockernut came into the prize winning class, whereupon a special lot of prizes for shellbarks and mockernuts were given. This enables us to do what would be accomplished in offering prizes for best nuts of each species of hickories. The same score card and tables therefore are used for each of these species. It is convenient, in judging nuts, to differentiate between the pecan on the one hand and the other hickories on the other, although study recently put on the matter would seem to show that this distinction is not exact and that some nuts, for example, which apparently are pure pecans are really pecan hickory hybrids.

The differences between the structure of the shell of the nuts of certain of the walnuts is greater than between the shell structure of the hickories and the walnuts may be divided into three classes. Hybrids between a number of species are found which have been formed naturally, and seemingly hybrids between all species are possible. It is convenient in judging nuts to differentiate between English walnuts, black walnuts, and butternuts, which nuts are representative of the three walnut classes and to include with the butternuts, the Japan walnuts. This will strike many people as a strange classification, i. e. to include the butternut and Japan walnut, but I feel sure that no one who has given the matter much study will so consider it. Whenever the two grow in proximity they hybridize so freely that one may be almost certain of not getting pure species if he plants nuts and raises seedlings. Indeed I have received many such hybrids which have been called either butternuts or Japan walnuts. As a matter of fact the same difficulty exists in distinguishing butternuts and Japan walnuts that exists in distinguishing hickories. There is no name which includes the butternut and Japan walnut as there is to include the various species of hickories, and, as such a name is urgently needed, I have used the word "butterjaps." This includes butternuts, Japan walnuts and hybrids between them. While it doubtless will be convenient to continue the names butternut and Japan walnut it should be understood that usually they will mean simply nuts which, as far as appearance is concerned, would seem to be one or the other, but very likely may be hybrids between the two species and might be more properly called by some name e. g. "butterjaps," which would include the two species and hybrids between them.

At this point the Convention took a recess to enable a photograph to be taken and immediately after reassembled for a business sesssion.

BUSINESS SESSION

PRESIDENT W. C. REED IN THE CHAIR

PRESIDENT REED: If Mr. Patterson is in the room, we will be glad to hear from him at this time. He has a matter he wants to bring before us.

MR. PATTERSON: Mr. President and Gentlemen: The National Nut Growers Association for some three years have had a standing committee on federal aid for the nut industry. Two years ago through the instrumentality of that committee, the appropriation for investigational work was increased by some fifteen thousand dollars from the previous appropriation. The total appropriation along this line now is thirty thousand to thirty-five thousand dollars. During the past year the almond growers felt the need of some encouragement and help from the Department of Agriculture, and the last appropriation was increased but was not made specific for the pecan industry, but for the nut industry in general in the United States which was entirely agreeable to the pecan people. And now I appear before you especially to call your attention to this movement and to suggest that this association should appoint a committee to co-operate with a committee from the National Nut Growers' Association and the Almond Growers' Association, and the nut growers of Washington and Oregon in an effort to secure an appropriation from the Department of Agriculture which would commensurate with the needs of the great nut industry in the United States. As we all know, it is entirely in its infancy as a commercial proposition and I doubt not we all agree as to its wonderful possibilities. The recommendation from the Secretary of the Department of Agriculture has gone to the House committee this year without any increase over the appropriation of last year; so that it will be necessary if any increased allowance is made, that pressure shall be brought to bear upon the House committee of agriculture, or the Senate committee (the bill is before the House committee at present), to get them to appreciate the importance of this appropriation. I might say I am on my way to Washington now to see if I can do anything in co-operation with the California Almond Growers Association and such other co-operation as we can get to see if we can get an increase in the appropriation over and above the appropriation recommended by the Secretary of Agriculture. The Secretary is not opposed to a higher appropriation, but he has had orders from higher up not to recommend any increase. I thank you for the privilege of bringing this matter to the attention of the Association with the suggestion that, if it meets with your approval you appoint a committee to co-operate with the other committees already appointed by these other associations.

PRESIDENT REED: You have heard the suggestion by Mr. Patterson. Are there any remarks?

MR. BIXBY: I move, Mr. President, that a committee on Federal Aid be appointed for that purpose, to co-operate with the other associations for the purpose of securing for the nut industry an appropriation sufficient or at least somewhere near sufficient for the work in hand. There is much work to be done that should be done now.

MR. OLCOTT: I second the motion. Mr. President.

PRESIDENT REED: You have heard the motion. It is moved that a committee be appointed for this work, as suggested. All in favor of the motion say Aye. Contrary same sign. It is CARRIED. I think it would be well to leave that committee to the incoming president. That was your idea, Mr. Bixby, was it?

MR. BIXBY: I didn't think that far.

PRESIDENT REED: That won't be far off, and I think it would be well to leave the appointment of that committee to the incoming president. I think also, it would be well, before appointing that committee, to confer a little bit to see who could possibly attend, could go to Washington, and would have the time to give to it.

PRESIDENT REED: We will now have the report of the nominating committee.

REPORT OF THE NOMINATING COMMITTEE

Your committee on Nominations, having in mind the rapidly expanding interest in Nut Culture and the need of the Northern Nut Growers Association for a board of officers especially equipped for extending development on broad lines, respectfully submit the following nominations:

For President—WILLIAM S. LINTON, Saginaw, Michigan.
For Vice-President—JAMES S. MCGLENNON, Rochester, New York.
For Secretary-Treasurer—WILLARD G. BIXBY, Baldwin, New York.

For Acting Secretary—DR. W. C. DEMING, Wilton, Connecticut.
For Executive Committee—MESSRS. LINTON, MCGLENNON, BIXBY,
W. C. REED, AND J. RUSSELL SMITH.

(Signed)
Ralph T. Olcott
James S. McGlennon
Robert T. Morris
William S. Linton
J. F. Jones

MR. OLCOTT: Secretary-Treasurer Bixby has suggested that the work of his office be divided, he to look after the financial affairs and the nut contests, Dr. Deming to assume the work of the Secretary proper. The constitution provides that the three principal officers and the last two retiring presidents be the executive committee. As the constitution specifically provides regarding this matter, the committee suggests the position of acting secretary for Dr. Deming until such action may be taken as will conform to the constitution.

PRESIDENT REED: You have heard the report of the committee. What is your pleasure?

MR. C. A. REED: I move that this report of the committee be unanimously adopted and the officers be elected, and the secretary so cast the ballot.

MR. SMEDLEY: I second the motion.

PRESIDENT REED: All in favor of that vote say Aye. Opposed, No. CARRIED. I hereby instruct the secretary to cast the unanimous ballot of the Association for the list of officers as read.

The Secretary then cast a ballot for the persons on the report of the Nominating Committee, and declared the following elected:

President—WILLIAM S. LINTON, Saginaw, Mich.

Vice-President—JAMES S. MCGLENNON, Rochester, N. Y.

Secretary-Treasurer—WILLARD G. BIXBY, Baldwin, New York.

Executive Committee—The above three and W. C. REED, Vincennes, Ind., and J. RUSSELL SMITH, Swarthmore, Penn.

Acting Secretary—DR. W. C. DEMING, Wilton, Conn.

PRESIDENT REED: In regard to the change in the constitution, that will have to go over until next year.

MR. OLCOTT: The constitution provides that notice be given to this convention for action to be taken a year from now; or that thirty days before action is taken, the notice be sent to the members. It seems to me that inasmuch as the action proposed is fully understood, that Dr. Deming is available, and Mr. Bixby kindly consented while Dr. Deming was tied up in the war work to look after this work, that there really is enough for two, and as both are agreeable, this is the time to take that action to become effective a year from now unless you can bring it about quicker.

President Reed: I should think it is only necessary to take the action on that. If there is some one better posted on parliamentary law, who thinks entire action better be taken at this time, I will entertain a motion. If not, we will let it stand as it is at present.

Mr. Olcott: I move that it is the sentiment of this convention, and that the members should be notified through the annual report and the regular proceedings, that that action is contemplated—to divide the office of Secretary-Treasurer at the next annual meeting, and that the constitution be changed as follows:

That Article IV, *Officers,* be changed as follows: There shall be a president, a vice-president, a treasurer and a secretary, who shall be elected at the annual meeting; and an executive committee of six persons of which the president, two last retiring presidents, vice-president, treasurer and secretary shall be members. There shall be a state vice-president from each state, dependency, or county represented in th membership of the association, who shall be appointed by the president.

That Article VII, *Quorum,* be changed as follows: Ten members of the association shall constitution a quorum, but must include a majority of the executive committee, or two of the four elected officers.

Voice: I second the motion.

President Reed: It is moved and seconded that this matter come up at the next annual meeting to be voted on as presented by Mr. Olcott. All in favor say Aye; opposed, No. Carried. I believe we have a report of the auditing committee that should come up.

Mr. C. A. Reed: Mr. Chairman, I believe I am the sole member of the Auditing Committee who is present. I have to report that the committee has not acted, but I think we can do this if agreeable: If you will leave it to the committee to audit the account, and if the committee finds the account is not accurate, to report to that effect next year and bring Mr. Bixby to time, then; otherwise say nothing about it.

President Reed: I think we are willing to do it on that basis. Mr. Secretary, are there any other things that ought to come up that you think of?

Mr. Bixby: I have a resolution here if this is in order now. This resolution is sent from Mr. Littlepage.

"Whereas this Association is justly jealous of its character and standing among the nut-growing public of this western continent and especially among the northern nut culturists, amateur or professional; and

"Whereas this Association views with distrust and some alarm the growing and questionable practice of selling seedling pecan trees to the general public; and

"Whereas it developed at a recent meeting of the Southern Nurserymen's Association held at Atlanta, Georgia, that seedling pecan trees from the gulf states were being distributed in the territory north of the Ohio River; and

"Whereas this practice, if continued, will work a distinct disadvantage to the industry in general as well as to the planters in particular;

Therefore be it Resolved, That this Association now and here vigorously record its view on this question as follows: That we protest against the above named practice and urge upon the nurserymen of the United States the importance of discouraging the practice of planting seedling pecan trees for orchard purposes in particular; and further that especially shall extreme caution be used to prevent the shipment of southern seedling pecan trees for planting in the territory north of the Ohio and Potomac Rivers, and further be it

Resolved, That the secretary communicate a copy of these resolutions to the President of the American Association of Nurserymen with the request that his organization take cognizance of this condition and take such steps as are compatible with its authority and sentiment to repress such reprehensible practice on the part of the American nursery trade."

I will introduce this as a resolution.

Voice: I second the motion.

President Reed: You have heard the resolution which has been seconded. Are there any remarks?

Mr. C. A. Reed: I would like to add a word of explanation. There are only two or three nurserymen in the South engaged in that practice. There are several northern men who are in the nursery business in the South who have raised the question as to the propriety of that practice, and the question has been discussed at the meetings of this southern association with a good deal of heat and vigor. The southern people will not plant seedling pecan trees at all, but these few nurserymen do a few hundred dollars' worth of business every year by sending their product to big nurseries here in the North, general fruit-tree nurseries and they in turn distribute these trees through the North. These northern friends of ours who are now in the South, put through a resolution asking that the matter be discussed at their meeting this year at Atlanta, the meeting held in August, by myself representing the Department of Agriculture. I was unable to be present, but I sent down a paper which was read by my associate in the office, and he tells us that ninety per cent of the southern nurserymen were with us in opposing that practice; that it is only those two or three and their associates who practice it. And it is as a result of that situation that this resolution has been proposed. Prof. Lake, secretary of the American Pomological Society, has been in the South working an pecans and is quite familiar with the situation, and he drew up this resolution. It is something that by all means should be stopped if possible. The southern pecan does not succeed in the North anyhow, and even it it did, we do not want the kind of pecan tree up here that the southerners would not plant themselves.

PRESIDENT REED: Are you ready for the question? All in favor of adopting the resolution as read, say Aye. Contrary, same sign. It is so CARRIED.

MR. C. A. REED: I would like to suggest that a copy of these resolutions be sent to the secretary of the Southern Nurserymen's Association, Mr. O. Joe Howard, Hickory, N. C.

MR. BIXBY: I have a telegram from Mr. Littlepage which I will read. "I regret exceedingly it is impossible to attend the meeting this year. Signed, T. P .Littlepage."

MR. J. F. JONES: I make a motion that Dr. Walter Van Fleet be made an honorary member of this Association for his valuable work in nut culture and hybridizing.

MR. OLCOTT: I second the motion.

PRESIDENT REED: It has been moved and seconded that Dr. Walter Van Fleet be made an honorary member of this Association for his valuable work in nut culture. All in favor say Aye. Contrary, No. It is CARRIED.

MR. BIXBY: The place of the next meeting is decided before the meeting adjourns, I think, or else provision made for it.

PRESIDENT REED: As I understand it, it is either decided or you vote to put it in the hands of the executive committee.

MR. BIXBY: Provision in some way is made for it. On that subject I would like to say a word. We have an invitation from Mr. Littlepage, and in considering the place of the 1919 meeting there were really three different locations spoken of—one Washington, D. C., one New York City or some point near there, and one Lancaster, Pa. Heretofore we have practically decided the place of the meeting on consideration of being able to see near there nut trees of interest. I think every meeting has been decided with that idea in mind. This year each of the three places offered promise of being very attractive in a year or two, but not in 1919. In the case of the meeting at Washington, we could see Mr. Littlepage's orchard of pecans, thirty acres in extent, which year before last put out a few flowers, and this year quite a number, and he expects nuts next year. There are also the many things to be seen around Washington,—the Department of Agriculture, and Dr. Van Fleet's work besides a number of other things. And at Lancaster, Pa., there has been a chance the past year to see some remarkable work on top worked hickories, that is, the early bearing of crops of fine nuts. Then again very soon on Capt. Deming's place at Georgetown, Conn., is going to be the greatest opportunity for top-worked hickories anywhere to be seen. He has more young seedling hickories top worked to fine varieties than any one else that I know of. As a matter of suggestion it would seem to me well—this is only a suggestion, of course—that the matter be left with the executive committee, and next spring or summer when it is possible to get an idea as to which of these three places offers the most to see in the line of nut trees, then they could decide where it is best to go. That would be the suggestion that I would make.

Mr. McGlennon: One of the suggestions was Rochester, N. Y. I think there are things worth while there in nut culture to be seen, and I know that we who are interested in nut culture would like to have the convention there; and I know also our Chamber of Commerce in the city would be very happy to have it there. So that in considering the place for the next meeting, I hope Rochester, N. Y., will be incorporated in the thought.

Mr. Pomeroy: Mr. President, I would also suggest you might come to Lockport, N. Y. Out northeast of Buffalo there were shipped eighteen hundred pounds of walnuts to the Buffalo market this fall. North of Lockport is a man who supplies the country stores with English walnuts. As long as there are any of these walnuts in the baskets exposed for sale, those which were purchased from the wholesalers from California are left unsold. I went into one store and the store-keeper had some home grown English walnuts out in the back room. I said, "Why do you keep them out here?" He said, "I have three bushels of California walnuts, and I keep these here until the others are sold. If I put these out in front, I would not sell the others at all."

Mr. Bixby: I would be glad to include Rochester, or Lockport, or any other place suggested, and leave it to the executive committee with the power to act.

Mr. C. A. Reed: Mr. President, we know pretty nearly what could be seen at most of these places next year. There is not going to be a great change in what there has been this year, and it seems to me the sooner we can definitely decide upon this thing and get it a matter of record, and plan for it, the better it will be. We can go around from one place to another. We want to go to all these places during the next three or four years, and we have a definite invitation from Mr. Littlepage; and while he didn't so state in his telegram, in conversation with him on Friday by telephone, he said he would like to have them come there the latter part of August or first of September; and to make the matter definite and know where we stand early in the game, I move we accept Mr. Littlepage's invitation for a meeting about the first of September.

Mr. Olcott: I second that motion, and add that at the Stamford convention, that is the very argument I made. Before that meeting it had always been left to the executive committee. It had been the custom of Dr. Deming, the secretary, to defer the matter of the place of meeting until a few weeks before the date for it. Nobody knew, and the committee decided, and the time was too short to get anything like the attendance we should have. If we should publish in the American Nut Journal for a year where the meeting is to be, you would get a year's advertising of that matter, and could plan better thereby.

President Reed: You have heard the motion.

Mr. Bixby: The only reason I had in making the suggestion I did, was the possibility of one place or the other showing more importance but as Mr. Reed said, we want to do all these places mentioned at some time. It does not make much difference which we do first. We should like to take first the place where there is most to be seen, of course.

President Reed: If there is no further discussion, all in favor of accepting Mr. Littlepage's invitation for Washington for the next meeting say Aye. Contrary, No. It is Carried.

J. F. JONES: The reason I did not push Lancaster is that some experiments on spraying are being conducted there and it will be a year before that will show up. The nut growers could see that better the year following.

PRESIDENT REED: If there is nothing else, I believe we are ready to turn over the gavel to our new president.

MR. C. A. REED: Mr. President, there is an important committee you have not appointed. I was out of the room when Mr. Patterson suggested this morning that a committee be appointed. Has that been attended to?

PRESIDENT REED: I expected to let the incoming president appoint that committee before we adjourn.

MR. SMEDLEY: I will make a motion that Mr. Patterson represent us and have the endorsement of this Association as to demanding more appropriations for the work in hand.

J. F. JONES: I second the motion.

PRESIDENT REED: It is moved and seconded that Mr. Patterson be appointed to represent us before congress in connection with the appropriation.

MR. PATTERSON: If everyone on the committee could go to Washington as soon as we can get at the House committee for a hearing, that would be the way to get action on the matter. Of course, the endorsement of the Association is good, and if you could get a committee of some one who could go down and help re-enforce it, there, we would appreciate it very much.

PRESIDENT REED: I think the incoming president will be one who will be going down. If he will come forward, I am ready to turn over the gavel.

At this point, Mr. Linton, the newly elected president, took the chair.

PRESIDENT LINTON: Ladies and Gentlemen: I am sure that you will all concede that I have not sought official position, and no one could have been more surprised than I, when I was presented with the report of your committee. I have been much interested in the work that is being carried on by this association; and of course if I can be of any value to the association or to the cause in the position of president during this particular year, why I accept that duty. But I would like to impose one or two conditions. I know that your hearty co-operation will be given. That would be one condition. But I am sure that each and every one of you can assist in adding greatly to the membership of this organization. We should at least have fifty members in each state within our jurisdiction. That would mean, perhaps one-half of the states in the Union. That would mean one thousand members. Now, in accepting this position, I am going to ask each and every active member through his friends and acquaintances to solicit and secure twenty-five members. Now, I will double that amount, and agree during the year, to add fifty good members to the association. That means over one thousand during the year, and that is one goal that I hope we can reach during this particular year, 1920. So far as the growing of nuts is concerned, so far as the details connected with the work that you have been engaged in is concerned, I propose leaving those things to those whom I consider experts, Dr. Morris, our friend Reed from Washington, and others that I might name; but the particular lines that I would like to follow this year, gentlemen, and what I hope to receive your earnest support in is an addition to your membership so that it may exceed a thousand; and assistance in legislation throughout the country along the line that we have worked out in our peninsular state of Michigan. I am glad that you decided upon Washington as the place of the next meeting, and as I have intimated in my remarks heretofore, I believe we have there a Michigan Senator who will assist in national legislation along the lines that we desire, because they are right ones; and in his position as chairman of the committee on post offices and post roads of the country, being at the head of the highway legislation, there is no man in the United States as competent to help us along that line, and I feel sure that we will get that assistance and support. With these few lines I will close, and I sincerely hope you have not made any mistake at this session; and when we have rounded up our year's work, that we can all say it has been a successful one. I thank you. (Applause). The committee on Federal Aid that the in-coming president was to appoint, I will name as follows: J. M. Patterson, Dr. Morris, Dr. Kellogg, Mr. Littlepage, Mr. Bixby, Mr. Jones and Mr. McGlennon.

Mr. Bixby: Senator Penney would like to say a word.

Senator Penney: I hadn't any intention of saying a word. But I am particularly pleased that you elected my friend, Mr. Linton, as president of the organization. I have known him a good many years, and I know he is an industrious worker. In anything that he undertakes to do, you will always see results. I am sure that in the lines which he has expressed himself as being anxious to cover, your membership.

the matter of legislation, I am sure that you will see some results that will be very gratifying to the Association. I do not know as there is anything further I wish to say. But I have been very interested in these meetings. I am not a nut grower, and I hardly know one nut from another, excepting that I am like the squirrel, if I get hold of a good nut I like to eat it; but I have certainly learned a lot of things from this association, and I am very pleased to be present.

PRESIDENT LINTON: I am going to ask Senator Penney to become a member of this association.

MR. BIXBY: He is a member.

SENATOR PENNEY: I have gotten two since I have been here, so I am going to pledge myself for two or three more for the next year.

MR. OLCOTT: I think one subject should not be overlooked, and that is the matter of resolutions. There is Dr. Kellogg's very courteous offer and treatment to be remembered, and perhaps some other things. If there is not such a committee, I think some one ought to be appointed on it to report very soon before we close. I move that a committee on resolutions be appointed.

C. A. REED: I second the motion.

PRESIDENT LINTON: Gentlemen, you have heard the motion made by Mr. Olcott. Are you ready for the question? Those who favor the motion say Aye; opposed, No. The resolution is ADOPTED. I appoint Mr. Olcott, Mr. Bixby, Senator Penney, Mr. Jones and Mr. Patterson.

C. A. REED: There is a little bit of news I would like to tell the members of the association. Yesterday afternoon, a gentleman who is a patient across the street at the sanitarium, came down to the nut exhibit in a wheelchair and looked on with interest at what was shown there, and presently he called Mrs. Reed over to talk with her a little and ask something about who was connected with that exhibit; and the next thing he asked me to sit down by him. He was not able to get around, to stand, and he told me this: that four years ago he met a Mr. Page from Tulsa, Oklahoma, a man who is evidently a man of a good deal of means in the oil business there, who is very philanthropic in his activities, a man who has adopted two hundred children, I believe it is; and he proposed to this gentleman, who was Mr. Dow of Jamestown, N. Y., that he go to Oklahoma to establish a nut arboretum. He was willing to set aside two hundred acres of land and to endow it with $200,000 if this Mr. Dow would go and take charge of it. He also offered to build a $25,000 house on the place. But Mr. Dow is director of the Leadsworth Forest Arboretum, some sixty miles up the Genesee River from Rochester, and of course he did not feel that he could leave the work he was doing there and devote his energies to a new work. I thought that was something that we northerners would be very much interested in, and I think we ought to see if that offer could not be taken advantage of.

MR. BIXBY: Can any one here tell me where seedlings of the big western shellback. *Carya laciniosa,* can be obtained? I would like to get 100 of them.

C. A. REED: Probably the best place to get that information would be from the U. S. Forest Service. That bureau keeps in touch with such informtaion. They have catalogs and they have lists of nurserymen having various trees including nut trees; the U. S. Forest Service, Department of Agriculture, Washington, D. C.

PRESIDENT LINTON: Mr. Reed informs me that it is the intention to close this session at this time.

J. F. JONES: I don't think we ought to close without passing a resolution of thanks to Dr. Kellogg for the nice entertainment here, the free service, the rooms, etc.

VOICE: I support the motion.

PRESIDENT LINTON: You have heard the motion offered by Mr. Jones. We can take a recess and adjourn after we take the trip through the buildings.

C. A. REED: If there is no one there but the president, officers and the committee, they would still have the authority to adopt these resolutions, and then properly adjourn.

PRESIDENT LINTON: If that is the consensus of opinion, we will take a recess until called to order again by the chair following the trip through the buildings.

C. A. REED: The idea was to take a recess until after our trip this afternoon and adjourn then. At that time this committee will be prepared with its resolutions.

PRESIDENT LINTON: We can not fix a definite time. It will be following the afternoon session with Dr. Kellogg. If there is nothing more to come before us at this time, a recess will be taken until after that time.

The convention then took a recess and reassembled at 2 p. m. at which time an old fashioned straw sleigh ride was taken to the buildings of the Kellogg Pure Food Company. Here Dr. Kellogg met the party and conducted them through, explaining the various products made and the processes by which they were made, and also that the large plant of the company was a growth from a very humble beginning, started originally for the purpose of providing food for the Sanitarium that was impossible to procure any other way. Persons who had been guests of the Sanitarium, after leaving it, have wished to get some of the food products they had had when there, and in that way, a demand was made which had grown, till many of them were supplied to the jobbing trade. A most enjoyable lunch enabled the party to sample many of the products.

From the Kellogg Pure Food Company, the sleigh took the party back to the Sanitarium through which they were conducted and shown the remarkable facilities for providing the guests with every kind of medical treatment that had proved valuable. It would be difficult to find a place where apparatus for treating every form of disease is equal to that of the Battle Creek Sanitarium or where such facilities exist for providing patients with all means for their comfort and for the recovery of their health. A most interesting talk illustrated with lantern slides, showed the growth of this institution from a modest beginning in a dwelling house, 54 years ago.

After this the convention reassembled and adjourned at 5 p. m.

THE 1919 NUT CONTEST

Willard G. Bixby, Baldwin, Nassau Co., N. Y.

The nuts sent in to the 1919 contest have been finished at last but the date is only a few days ahead of the date last year when the 1918 contest was finished, which is to me a matter of a good deal of chagrin as it was last year. No attempt was made to examine the nuts received till after the first of the year as the experience of last year showed this to be a waste of time. Several things seemed, this year, to conspire to prevent getting started on the examination. The number of nuts received was large and the time taken for examination quite considerable for no attempt as yet has been made to have but one person work on it. But the thing that has caused the greater part of the delay was the wide variation between the results in the tests of those nuts which were sent into both the 1918 and 1919 contests, and my unwillingness to have these results appear in print until the reasons for these discrepancies could be stated with certainty.

Had the methods used been those in use for some time and whose correctness had been proven, these differences would have caused little concern, but inasmuch as the methods for measuring most of the nut characteristics were used for the first time in 1918, and they had been devised by me, I could not help feeling that there was a possibility of the discrepancies being due to imperfections in methods for, at first, it would seem likely that nuts borne by a given tree one year would be like those borne the next year. I considered therefore that it was for me to prove beyond question that the methods used were sound and that the differences noted were real. The amount of time needed to do this at a period when my time was well occupied with other things has been more than I wish it had been. While many efforts were made to see if there were imperfections in the methods used for measuring the various characteristics, no such imperfections were found, and, for a considerable period, all efforts made to explain the differences in tests made on nuts borne by the same trees in different years were unproductive of results. Finally the matter was settled to my satisfaction as is noted in the next paragraph.

The Clark hickory received 79 points last year when it took the first prize. It tested out 11 points less this year when first tested which put it entirely out of the prize winning class. Repetition of this year's tests gave results agreeing fairly well with the first ones made but still not all comparable to those of last year. This was decidedly disconcerting when one of the principal results expected of the adoption of methods of measuring nut characteristics was the possibility of testing a given nut now and several months hence and obtaining the same verdict. After much work designed to see if the methods of measuring nut characteristics were faulty and nothing wrong had been found with them, a visit was made to the tree. Mr. Clark said that it bore a good crop every other year and but few nuts in the intervening years, and that the nuts were much better the years when a good crop was borne than they were in the other years. This was interesting information but I could not help realizing the difficulty of carrying in one's mind, from one year to the next, the merits of hickory nuts, and felt that, unless the matter could be proven, I had not as yet done very much to solve the problem at hand. Mr. Clark, however, gave me practically all the nuts of the 1919 crop which he had and I returned feeling that this trip had not done much to solve the problem as to why the tests on the 1918 nuts and 1919 nuts should be so different. Very careful examination was made of the few Clark hickory nuts remaining in my possession of the 1918 crop and they were compared with those of the 1919 crop. Slight differences in shape were noted and finally one nut was found seemingly just like the nuts that won the prize in 1918. When this nut was tested it gave substantially the same results as those tested in 1918. Another like it was afterward found where the result was repeated. This proved definitely that the trouble was not with the methods, and that, in off years, with the Clark hickory at least, some few nuts were borne that would test out as well as those borne in good years. The results of the tests on these good nuts borne in 1919 were substituted for those on the inferior nuts previously tested for in contests it is always the intention of those sending in nuts to send in the best.

It will be noted that the number of points finally awarded the Clark hickory for example this year is less than awarded last year. This difference is due to the method of scoring. In a matter as new as methods for measuring nut characteristics, the constants which have to be determined by experience must change somewhat at first. The method used this year in testing nuts sent in to the contest was to judge them on the basis used in 1918, redetermine the constants that required it, and work out the results again. An example will help to make this clear.

Take the matter of proportion of kernel, the highest award for which was 15 points in 1918 and also in 1919. Up to the time the 1918 contest was decided the hickory with the largest proportion of kernel was the Beam, Nut No. 3, of the 1918 contest with over 50% of kernel and the lowest was the Brown mockernut of the 1918 contest with 18% of kernel. On the basis of the difference between the highest and lowest the number of points to be awarded each was worked out. On this basis the Clark hickory was awarded, in 1918, 10 points for a proportion of kernel of 40.8%. In the case of the 1919 contest nuts with larger proportion of kernel were found, the Hatch bitternut with 65%, and the Halesite bitternuts with 69% kernel. A mockernut from Sliding Hill, Jackson, S. C. with only 14% kernel was also found and the figures for awarding points for proportion of kernel were recalculated as follows:

	Points		Points
69% and over	15	65.3% to 68.9% inclusive	14
61.7% to 65.2% inclusive	13	58.0% to 61.6% inclusive	12
54.3% to 57.9% inclusive	11	50.7% to 54.2% inclusive	10
47.0% to 50.6% inclusive	9	43.3% to 46.9% inclusive	8
39.7% to 43.2% inclusive	7	36.0% to 39.6% inclusive	6
32.3% to 35.9% inclusive	5	28.7% to 32.2% inclusive	4
25.0% to 28.6% inclusive	3	21.3% to 24.9% inclusive	2
17.7% to 21.2% inclusive	1	14.0% to 17.6% inclusive	0

On this basis the Clark hickory was awarded but 7 points for the same proportion of kernel in 1919 instead of 10 as in 1918. This accounts for 3 out of the 5 points difference between the 79 points awarded in 1918 and the 74% in 1919. The other two points can be similarly explained. There are bound to be similar changes in the tables for awarding points from year to year, but they will be less and less as time goes on. For example, the Wasson butternut of the 1915 contest which weighed 18.8g was the largest butternut received until 1919 when two larger came in, one weighing 19:5g and the other weighing 22.6g. The Mott shellbark hickory which weighs 29.6g which was discovered by Dr. Morris before the founding of the Association is still the largest hickory of which we know. On the other hand the black walnut record for size was exceeded in 1918 and also in 1919.

The nuts received were gone over carefully and all characteristics measured where this was possible, then the other characteristics were passed on by me. Then the best nuts were brought to the attention of Dr. Morris and Dr. Deming and the three of us passed on those characteristics where methods of measurement had not been worked out.

The results of this contest are noted in considerable detail as it is believed that they may have value as matters of record. While an attempt has been made to give the species of each nut tested as such information is useful, it must be understood that the notations of species are tentative and subject to change should further knowledge require it. It is, frequently, difficult to positively identify a nut as to species without having leaves, buds, bark and husk for examination and in most instances the judges did not have these. No nut is noted as a hybrid unless it has been proven so by evidence which it is believed is beyond question, yet there are a number of nuts noted as pure species which later may be proved to be hybrids. This is particularly so in the case of the hickories.

In explanation of the tables it should be noted that weights of nuts and kernels are expressed in grams, while cracking pressures are expressed in kilograms. The methods used for measuring the various characteristics are noted in detail in the article "Judging Nuts" on pages 122 to 132 inclusive.

The two items cracking quality need a little explanation. Last year 20 points were awarded for cracking quality and 5 points for plumpness of kernel. Plumpness was very difficult of estimation. It means the reverse of shrivelled. To assign values for this can only be done by appearance and it seemed impossible of measurement. A study of the nuts of the 1918 contest which were awarded high values for plumpness and those which were awarded low values showed that in no case was a nut which had a shrivelled kernel awarded a high value for proportion of kernel. Sometimes a nut with a plump kernel had a very thick shell and a low proportion of kernel but in no instance did a nut with a shrivelled kernel have a high proportion of kernel, so it was thought that for practical purposes the figure for proportion of kernel would answer very well to represent excellence in both characteristics. It was also evident that the ratio of the weight of the portion of the kernel which, after cracking, could be easily picked out with the fingers to the total weight of the kernel, which was taken to represent cracking quality last year, was capable of more refinement for it was noticed that of those nuts where the entire kernel could be easily picked out with the fingers after cracking that some were better crackers than others, for, in some instances, the entire kernel fell out. As the proportion of the kernel which could be picked out easily with the fingers is seemingly the most important this was still given 20 points and called "cracking quality commercial," and the figure representing the proportion of kernel which dropped out after cracking was called "cracking quality absolute." and awarded the 5 points formerly awarded to plumpness.

In the case of the hazel which generally has a cracking quality both absolute and commercial of 100% the item "freedom from fibre" was substituted for "cracking quality absolute." The hazel seems to be the only nut where this characteristic must be considered.

It is too bad that while practically all characteristics are determined with exactness to a single point and could be even more precisely determined, that the item quality and flavor of kernel to which 20 points are justly awarded has to be determined in so crude a manner as it is at present. It is true that formerly all characteristics were determined in equally crude manner and we should be glad that all others can be determined with precision but still having one quality not precisely determined, to a certain extent prevents exact determination of the others having the value it otherwise would. We can make only about five graduations in quality which would be differences of five points except at the top of the scale where it is 2 and an error in one gradation would make a difference of 5 points generally. When it is seen how close some of the nuts run, particularly the hickories, where the differences in total points awarded are generally only 1 point, with several of the same score, this crudeness of determination of one of the most important characteristics is the more regretable.

The results of the 1919 contest on nuts of the various species are as noted below:

HICKORIES—128 ENTRIES

The results of the tests on the prize winning hickories are shown in the table on page 151.

What is said of the difficulty of identification as to species is particularly applicable to the hickory where it is known that many of the fine nuts that we have are hybrids. While no nut is noted as a hybrid unless it has been so proven by evidence which it is believed is beyond question, there is considerable question as to whether a number of the nuts noted as shagbarks are really pure shagbarks. It will take more observation and study than it has as yet been possible to give them to determine this point. It is to be noted, however, that the more study we put on the hickories notable for the excellence of the nuts they bear, the more we find that give suggestion of hybrid parentage.

Beside the hickories noted above which received a sufficient number of points to entitle them to one of the eight prizes awarded the measure-

HICKORIES

NAME	ADDRESS	DESIGNATION	Species	Prize awarded	Average weight of nut	Average weight of kernel	Average weight of kernel that dropped out after cracking	Average weight of kernel that could be easily picked out with fingers after cracking	Average cracking pressure	Proportion of kernel	Cracking quality absolute	Cracking quality commercial	Size 10	Form 5	Color of shell 5	Husking quality 5	Thinness of shell 10	Cracking quality commercial 20	Cracking quality absolute 5	Color of kernel 5	Proportion of kernel 15	Quality of kernel 20	Total points awarded 100
Luther W. Vest	Blacksburg, Va.	Vest hickory	G	1	5.0g	2.5g	0.0g	2.5g	46kg	49.6	0.0	100.0	3	4	4	5	6	20	0	4	9	20	75
G. W. Manahan	Sabillasville, Md.	Manahan hickory	G	1	7.8g	3.8g	2.3g	3.4g	99kg	48.5	61.2	90.5	5	4	4	5	4	17	3	4	9	20	75
Eugene J. Clark	Ludlow, Mass.		G	2	6.5g	2.6g	0.0g	2.6g	83kg	40.8	0.0	100.0	4	5	5	5	4	20	0	4	7	20	74
Ralph T. Olcott	Rochester, N. Y.	Laney hickory	GxB	2	6.9g	4.0g	.7g	3.6g	46kg	57.5	17.6	90.4	5	5	4	5	6	17	0	3	11	18	74
Snyder Bros.	Center Point, Ia.	Fairbanks hickory	GxB	2	7.6g	3.6g	1.8g	3.6g	64kg	48.1	49.5	100.0	5	5	5	5	5	20	2	3	9	15	74
Mort Sturts	Hazel Dell, Ill.	Hickory No. 1	G	3	4.7g	2.2g	1.2g	2.2g	49kg	46.1	55.6	100.0	3	3	5	5	6	20	2	3	8	18	73
Howard G. Barnes	Fayetteville, O.	" No. 1	G	4	5.0g	2.6g	2.6g	2.6g	79kg	51.4	100.0	100.0	3	4	4	5	4	20	5	2	10	15	72
E. C. Beam	Mt. Oreb, O.	" No. 2	G	4	3.7g	1.9g	.6g	1.9g	43kg	50.0	33.3	100.0	2	4	3	5	6	20	1	2	9	20	72
Charles Swaim	South Bend, Ind.	Swaim hickory	G	4	5.1g	2.4g	2.3g	2.4g	42kg	47.5	97.2	100.0	4	3	4	4	6	20	4	3	9	15	72
G. E. Beaver	Millerstown, Pa.	Beaver "	GxB	5	6.7g	3.4g	0.0g	3.4g	29kg	50.3	0.0	100.0	4	5	4	5	7	20	0	2	9	15	71
Mrs. Augusta Patton	Walnut Hill, Ill.		G	5	6.5g	2.7g	2.2g	2.5g	77kg	40.5	81.6	92.8	4	4	4	5	5	18	4	2	7	18	71
E. C. Beam	Mt. Oreb, O.	Hickory No. 1	G	6	4.6g	1.9g	1.2g	1.7g	33kg	41.9	61.8	87.8	3	3	4	5	7	16	3	2	7	20	70
E. C. Beam	" " "	" No. 7	G	6	4.8g	1.6g	.8g	1.6g	68kg	33.4	46.9	100.0	3	4	3	5	5	20	2	3	5	20	70
James L. Glover	Shelton, Conn.	" No. 1	G	6	5.0g	1.9g	1.8g	1.9g	106kg	38.6	94.7	100.0	3	1	4	5	4	20	4	3	6	20	70
James L. Glover	" "	" No. 2	G	6	4.7g	1.9g	.9g	1.9g	68kg	40.0	50.0	100.0	3	2	4	5	5	20	2	2	7	20	70
J. F. Jones	Lancaster, Pa.	Weiker hickory	GxL	6	8.8g	3.1g	1.5g	3.1g	102kg	35.3	48.1	100.0	5	4	4	5	4	20	2	3	5	18	70
Sarah Kronk	Minford, O.	Hickory No. 3	G	6	4.2g	1.6g	1.3g	1.6g	140kg	37.6	83.6	100.0	3	4	4	5	3	20	4	3	6	18	70
Mort Sturts	Hazel Dell, Ill.	" No. 3	G	6	5.6g	2.3g	1.4g	2.3g	52kg	41.0	61.4	100.0	4	4	4	5	6	20	3	2	7	15	70
W. C. Deming	Wilton, Conn.	Terpenny hickory	G	7	5.5g	2.9g	1.4g	2.9g	63kg	52.8	48.3	100.0	4	3	4	5	5	20	2	1	10	15	69
William Gobble	Holston, Va.		G	7	9.7g	3.9g	.2g	3.9g	142kg	40.6	5.1	100.0	6	3	3	5	3	20	0	2	7	20	69
W. P. Griffin	Creal Spring, Ill.		G	7	5.2g	2.0g	1.5g	2.0g	113kg	38.5	75.0	100.0	4	1	4	5	3	20	3	3	6	20	69
Kate Yawger	Port Byron, N. Y.	Hickory No. 2	G	7	4.9g	1.9g	.2g	1.9g	95kg	39.0	11.4	100.0	3	4	4	5	4	20	0	3	6	20	69
Kate Yawger	" " "	" No. 4	G	7	6.0g	2.4g	1.8g	2.0g	121kg	39.1	76.3	82.6	4	4	5	5	3	15	3	4	6	20	69
E. C. Beam	Mt. Oreb, O.	" No. 4	G	8	3.6g	1.5g	.5g	1.5g	45kg	43.2	34.4	100.0	2	3	3	5	6	20	1	1	7	20	68
Sarah Kronk	Minford, O.	" No. 2	G	8	3.1g	1.3g	.6g	1.3g	82kg	41.3	4.7	100.0	2	4	4	5	4	20	0	4	7	18	68
Reuben J. Kurtz	Holly, Mich.	Hickory No. 2	G	8	4.4g	1.7g	1.1g	1.6g	111kg	39.4	64.0	93.0	3	5	4	5	3	18	3	3	6	18	68
E. Pomeroy	Windsor, Conn.	" No. 2	G	8	6.8g	2.4g	1.2g	2.2g	78kg	35.9	50.0	88.6	4	4	4	5	4	17	2	3	5	20	68
R. C. Hatch	Central City, Ia.		B		4.7g	3.1g	.2g	3.1g	19kg	65.0	6.5	100.0	3	5	3	3	9	20	0	2	13	0	58
Willard G. Bixby	Baldwin, N. Y.	Halesite bitternut	B		2.3g	1.6g	.0g	1.3g	13kg	69.0	0.0	80.1	1	5	3	3	10	15	0	2	15	0	54
S. A. Sipe	Carthage, Ind.	Stanley hickory	L		19.2g	5.9g	1.2g	2.9g	138kg	30.7	20.5	49.5	8	4	4	5	3	7	1	3	4	15	54

The abbreviations used under the species column are G for shagbark (Carya ovata), L for shellbark (Carya laciniosa), and B for bitternut (Carya cordiformis). Where two letters appear with an x between it means that the nut in question is a hybrid between the two species.

ments are given of the Hatch and Halesite bitternuts because they have the thinnest shell and highest proportion of kernel of any hickories yet discovered and of the Stanley hickory because it is the best shellbark of which we yet know.

Following out the plan adopted last year (when no prizes were offered for specific species of hickories) when a nut other than a shagbark sent judged by the hickory standard received sufficient points to put it among the prize winners, a special class was made for that. Some of the nuts in the above list are disqualified for receiving prizes as they are being "propagated." This term has been somewhat difficult of definition and in default of action of the Association or of some committee appointed for the purpose I have held it to mean those nuts which are listed in the catalog of any nurseryman. That is to say, a nut is eligible for prizes more than one year, and the mere growing a few grafted or budded trees of a variety and distributing them privately does not constitute "propagation" in the sense that the word is used in the nut contests. As soon, however, as any nurseryman considers a variety of sufficeint merit so that he lists it is his catalog or in any printed supplement to a catalog and states that he can furnish grafted or budded trees of this variety. from that time on it is debarred from receiving the prizes offered annually.

Other hickories were received from:

D. S. Bassett, Fisherville, Mass.
E. C. Beam, Mt. Orab, Ohio. (Nuts No. 5, No. 6).
W. F. Cook, Moscow, Ky.
W. E. Cornell, 302 Stewart Ave., Ithaca, N. Y.
F. N. Decker, Syracuse, N. Y. (Nuts No. 1, No. 2).
Joan Deming, Danbury, Conn., Route 2.
F. Earland Gilson, Groton, Mass.
Wm. H. Kuhne, Woodbury, Conn.
Reuben J. Kurtz, Holly, Mich., R. No. 3, Box 32.
Harvey Losee, Upper Red Hook, N. Y.
Mrs. F. A. Patch, West Townsend, Mass, Box 77
E. Pomeroy, Windsor, Conn. (Nut No. 1).
Ruth A. Reeves, Newark, N. Y.
Snyder Bros., Center Point. Ia. (Nut No. 1, seedling).
Mort Stuarts, Hazel Dell, Ill. (Nuts No. 4, No. 5. No. 6).
Walter K. Wilson, Watertown, Conn., Lock Box 2,
Kate Yawger, Port Bryon, N. Y. (Nut No. 1).
Grant Yeagley, Jamestown, Penn., R. R. No. 1.

BLACK WALNUTS—51 ENTRIES

The prize winning black walnuts exhibited and the prizes awarded are noted in the table of page 154. There is but one species of walnuts of the black walnut class native in the north eastern United States, the eastern black walnut, *Juglans nigra*. In this contest specimens of the Texas black walnut, *Juglans rupestris*, and of the California black walnut, *Juglans hindsii* were entered. Tests on these two black walnuts are noted for the purpose of record although no characteristics of value were noted. The California black walnut has a smoother shell than the eastern black walnut. The Texas black walnut has beautiful willowy foliage and grows very late in the fall and holds its leaves much longer than the other walnuts and it is of dwarf habit of growth. Tests on the Werner black walnut are noted because it is the largest black walnut we have. The black walnuts sent in this year were much poorer on the whole than those exhibited in some years. Some well known trees bore scarcely a nut. Some well known propagated black walnuts were tested but only two of them tested out high enough to get into the prize winning class, the Thomas and Ten Eyck. From what we know of the variation of nuts particularly of black walnuts, it is evident that we must test black walnuts more than one year to get a good idea of their value.

The nut sent in by John S. Bomberges is particularly noticeable on account of the unusually fine flavor of the kernel and would seem to be a standard of excellence for black walnut kernels.

Other black walnuts received from:

William A. Agner, Rockport, Ind., R. F. D. No. 1.
George A. Ede, Cobden, Ill.
M. H. Hoover, Lockport, N. Y.
C. S. Ketchum, Middlefield, Ohio. (Nuts No. 1, 3, 5, 11, 12).
A. H. Lang, 1628 Collingwood Ave., Toledo, Ohio. (Nut No. 1).
James E. Ripley, Tippecanoe, O., R. F. D. No. 2. (Nut No. 2).
S. A. Toy, Freeman, W. Va. (Nut No. 1).
G. G. Truman, Perrysville, Ohio. Box 167.
U. S. Department of Agriculture, Washington, D. C. Peanut black walnut.
Ira C. Wilson, New Truxton, Mo.

BLACK WALNUTS

NAME	ADDRESS	DESCRIPTION	Species	Prize awarded	Average weight of nut	Average weight of kernel	Average weight of kernel that dropped out after cracking	Average weight of kernel that could be easily picked out with fingers after cracking	Average cracking pressure	Proportion of kernel	Cracking quality absolute	Cracking quality commercial	Size 10	Form 5	Color of shell 5	Husking quality 5	Thinness of shell 10	Cracking quality commercial 20	Cracking quality absolute 5	Color of kernel 5	Proportion of kernel 15	Quality of kernel 20	Total points awarded 100
C. S. Ketchum	Middlefield, O.	Nut No. 10	B	1	14.1g	3.6g	2.9g	3.6g	183kg	25.5	80.5	100.0	2	4	3	3	7	20	4	4	7	18	71
John S. Bomberges	Lebanon. Pa.		B	2	16.4g	3.9g	2.5g	3.4g	208kg	23.8	64.1	87.1	3	1	4	4	6	16	3	4	5	23	69
Henry Hicks	Westbury, N. Y.		B	3	13.6g	3.1g	1.6g	3.1g	222kg	22.8	51.6	100.0	1	3	3	4	6	20	2	4	5	20	68
Amy A. Alley	Lagrangeville, N. Y.	Not the 1918 prize nut	B	4	15.8g	3.3g	2.1g	3.3g	177kg	20.9	53.7	100.0	2	3	3	4	7	20	3	4	3	18	67
James E. Ripley	Tippecanoe, O.	Nut No. 1	B	4	26.7g	6.3g	3.7g	6.3g	247kg	23.6	58.8	100.0	8	3	3	3	5	20	2	3	5	15	67
Snyder Bros.	Center Point, Ia.	Thomas black walnut	B		19.7g	4.7g	3.6g	3.9g	247kg	23.9	76.6	83.0	4	4	4	4	5	15	3	3	5	20	67
A. H. Lang	Toledo, O.	Nut No. 2	B	5	20.5g	4.6g	2.9g	4.1g	313kg	22.4	63.1	89.2	5	3	3	4	3	17	3	2	4	20	64
Kate Yawger	Port Byron, N. Y.		B	5	20.3g	4.5g	2.4g	3.8g	291kg	22.2	53.4	84.5	5	3	3	4	3	16	2	4	4	20	64
E. M. Ten Eyck	So. Plainfield, N.J.	Ten Eyck black walnut	B		16.7g	3.5g	1.8g	3.1g	154kg	21.0	51.5	88.6	3	3	4	4	8	17	2	2	4	15	62
C. S. Ketchum	Middlefield, O.	Nut No. 9	B	6	20.1g	4.7g	2.4g	3.5g	297kg	23.4	51.2	74.5	5	3	3	3	6	13	2	3	5	18	61
S. A. Toy	Freeman, W. Va.	Nut No. 2	B	7	21.9g	5.5g	1.6g	3.9g	225kg	20.5	29.1	71.0	5	3	4	4	6	12	1	2	3	20	60
Arnold Arboretum	Jamaica Pl'n., Mass.	From Rochester, N. Y.	R		6.1g	0.9g	0.7g	0.8g	357kg	14.8	67.8	89.0	1	4	5	4	1	17	3	1	0	13	49
G. Hunger	Tolhouse, Calif.	California black walnut	C		22.3g	5.0g	1.9g	3.1g	407kg	22.4	38.0	62.0	6	5	5	4	0	10	1	2	4	20	57
Edward A. Werner	Marion, Ia., R5		B		30.4g	6.5g	1.4g	2.5g	353kg	21.4	21.5	38.4	10	2	2	3	1	4	1	4	4	20	51

The abbreviations used under the species column are: B for black walnut (Juglans nigra), C for California black walnut (Juglans hindsii), R for (Juglans rupestris).

PERSIAN WALNUTS

NAME	ADDRESS	DESCRIPTION	Species	Prize awarded	Average weight of nut	Average weight of kernel	Average weight of kernel that dropped out after cracking	Average weight of kernel that could be easily picked out with fingers after cracking	Average cracking pressure	Proportion of kernel	Cracking quality absolute	Cracking quality commercial	Size 10	Form 5	Color of shell 5	Husking quality 5	Thinness of shell 10	Cracking quality commercial 20	Cracking quality absolute 5	Color of kernel 5	Proportion of kernel 15	Quality of kernel 20	Total points awarded 100
D. N. Pomeroy	Lockport, N. Y.	Crocker	P	1	9.6g	4.4g	0.0g	4.4g	5kg	45.9	0.0	100.0	1	4	4	5	10	20	0	4	9	18	75
Joseph H. Bair	Haddonfield, N. J.	Nut "L"	P	2	9.4g	5.0g	0.0g	5.0g	16kg	53.2	0.0	100.0	0	4	3	5	2	20	0	3	15	18	70
D. N. Pomeroy	Lockport, N. Y.	Howard	P	3	9.0g	4.1g	0.0g	4.1g	11kg	45.4	0.0	100.0	0	4	3	5	8	20	0	4	9	15	68
Richard Bagg	Hartford, N. J.		P	4	11.8g	5.2g	4.2g	5.2g	42kg	44.3	80.3	100.0	4	4	3	5	0	20	4	3	8	15	66
O. F. Witte	Amherst, O.		P	5	9.8g	3.3g	0.0g	3.3g	22kg	33.7	0.0	100.0	1	4	3	5	6	20	0	4	0	15	58
J. F. Jones	Lancaster, Pa.	Eureka (from Calif.)	P		14.9g	7.4g	0.0g	7.4g	25kg	49.6	0.0	100.0	10	4	5	5	4	20	0	2	12	20	82
Mrs. F. Schultz	Roslindale, Mass.	Boston	P		10.0g	4.0g	0.0g	4.0g	12kg	40.0	0.0	100.0	1	5	4	5	8	20	0	5	4	15	77
E. B. Holden	Hilton, N. Y.	Holden	P		12.2g	6.3g	0.0g	6.3g	31kg	51.4	0.0	100.0	5	3	4	5	3	20	0	5	13	18	76
David Landis	Lancaster, P. A.	Rush	P		11.1g	5.2g	0.0g	5.2g	18kg	46.8	0.0	100.0	3	4	4	5	6	20	0	4	10	18	74
John Garretson	Aspers, Pa.	Franquette	P		12.4g	5.6g	3.9g	5.6g	40kg	45.7	70.2	100.0	5	3	4	5	1	20	2	4	9	20	73

The abbreviation used under the species column is: **P for Persian walnut (Juglans regia).**

BUTTERJAPS—BUTTERNUTS, JAPAN WALNUTS, AND HYBRIDS—33 ENTRIES

The butternuts and Japan walnuts and hybrids between them are grouped together as they were last year although but one hybrid appeared this year. The need of a name to include these is apparent and the name butterjaps to include butternuts, Japan walnuts, and hybrids between them is used this year following out last year's suggestion. It was a very poor year for these nuts, many well known trees bearing no crop at all. The one hybrid exhibited which was sent in as a curiosity not for the purpose of being entered in the contest but it is interesting to note that it took a prize, although not a high one.

The prize winning nuts and prizes awarded are noted in the table on page 156.

Other butternuts received from:

C. Delp, Morrison, Ohio. (Nut No. 4).

Snyder Bros., Center Point, Ia. (Fairbanks butternut).

G. G. Truman, Perrysville, Ohio. (Nuts No. 2, 3).

Other Japan walnuts received from:

L. H. & P. J. Jr. Berckmans, 1213 Lamar Bldg., Augusta, Ga.

BUTTERNUTS

NAME	ADDRESS	DESCRIPTION	Species	Prize awarded	Average weight of nut	Average weight of kernel	Average weight of kernel that dropped out after cracking	Average weight of kernel that could be easily picked out with fingers after cracking	Average cracking pressure	Proportion of kernel	Cracking quality absolute	Cracking quality commercial	Size 10	Form 5	Color of shell 5	Husking quality 5	Thinness of shell 10	Cracking quality commercial 20	Cracking quality absolute 5	Color of kernel 5	Proportion of kernel 15	Quality of kernel 20	Total points awarded 100
G. G. Truman	Perrysville, O.	Nut No. 5	B	1	9.6g	1.6g	1.1g	1.6g	280kg	16.3	67.8	100.0	4	1	3	4	5	20	3	4	3	20	67
C. Delp	Morrison, O.	" No. 1	B	2	17.2g	2.7g	2.7g	2.7g	320kg	15.7	100.0	100.0	8	0	3	2	1	20	5	3	3	18	63
S. W. Snyder	Center Point, Ia.	Pumfrey 2nd	B	2	19.5g	3.4g	2.6g	3.4g	348kg	17.4	76.5	100.0	10	0	2	3	0	20	3	2	3	20	63
C. Delp	Morrison, O.	Nut No.3	B	3	13.3g	2.4g	2.4g	2.4g	326kg	18.0	100.0	100.0	6	1	2	4	1	20	5	3	4	15	61
C. Delp	Morrison, O.	" No. 5	B	4	12.6g	2.1g	2.1g	2.1g	308kg	16.7	100.0	100.0	5	0	2	4	1	20	5	2	3	18	60
Joe P. Wilson	Landon, Miss.	Butterjap	S x B	5	12.4g	2.4g	0.7g	1.8g	244kg	19.4	28.1	72.7	6	1	3	4	4	9	1	4	5	20	57
Wm. H. Kuhne	Woodbury, Conn.		B	6	8.7g	1.7g	1.0g	1.6g	232kg	19.0	59.0	94.3	3	1	1	4	4	18	2	2	5	15	55
C. Delp	Morrison, O.	Nut No. 2	B	7	10.7g	2.1g	.0g	1.5g	250kg	19.6	0.0	71.5	4	1	3	4	3	11	0	3	5	18	52
S. W. Snyder	Center Point, Ia.	Pumfrey 1st	B	7	17.5g	3.1g	1.3g	1.8g	300kg	17.7	42.0	58.0	9	0	2	4	1	8	2	2	4	20	52
Postmaster	Balsam, N. C.		B	8	13.9g	2.2g	0.6g	1.6g	249kg	16.0	27.2	73.9	7	1	2	2	4	9	1	3	3	18	50
G. G. Truman	Perrysville, O.	Nut No. 4	B		22.6g	3.3g	0.2g	1.9g	320kg	14.6	6.0	57.5	12	0	1	3	1	7	0	3	2	18	47
G. G. Truman	Perrysville, O.	" No. 1, Round shape	B		14.4g	2.3g	0.5g	1.1g	293kg	15.7	22.1	47.7	7	1	3	3	2	0	1	2	3	15	37

The abbreviations used under the species column are: **B for butternut** (Juglans cinerea), SxB for Siebold walnut, x butternut hybrid (Juglans Siebcldiana x cinerea).

JAPAN WALNUTS

NAME	ADDRESS	DESCRIPTION	Species	Prize awarded	Average weight of nut	Average weight of kernel	Average weight of kernel that dropped out after cracking	Average weight of kernel that could be easily picked out with fingers after cracking	Average cracking pressure	Proportion of kernel	Cracking quality absolute	Cracking quality commercial	Size 10	Form 5	Color of shell 5	Husking quality 5	Thinness of shell 10	Cracking quality commercial 20	Cracking quality absolute 5	Color of kernel 5	Proportion of kernel 15	Quality of kernel 20	Total points awarded 100
R. Bates	Jackson, S. C.	Stranger Heartnut	H	1	7.6g	2.2g	1.8g	2.2g	79kg	28.3	88.8	100.0	2	4	2	5	9	20	4	3	11	18	78
R. Bates	Jackson, S. C.	Tokio Heartnut	H	2	4.8g	1.4g	0.8g	1.4g	79kg	29.7	52.7	97.2	0	4	3	4	9	19	4	3	12	18	76
O. F. Witte	Amherst, O.	Heartnut	H	3	5.1g	1.5g	1.5g	1.5g	178kg	29.6	100.0	100.0	1	3	4	4	6	20	5	4	12	15	74
R. Bates	Jackson, S. C.	Heartnut near Mobile pecan	H	4	7.2g	1.8g	1.5g	1.8g	172kg	25.2	80.2	100.0	2	3	3	5	8	20	4	3	9	15	72
O. F. Witte	Amherst, O.	Siebold walnut No. 2	S	4	8.5g	2.2g	1.8g	2.2g	260kg	25.9	81.9	100.0	3	3	3	4	3	20	4	4	10	18	72
Joe P. Wi'son	Landon, Miss.		?	4	9.8g	2.7g	0.9g	1.9g	75kg	27.6	31.1	72.6	4	4	3	4	10	12	1	3	11	20	72
O. F. Witte	Amherst, O.	Siebold walnut No. 1	S	5	5.7g	1.5g	1.1g	1.5g	215kg	26.3	73.3	100.0	1	4	3	4	5	20	3	4	10	15	69
O. D. Faust	Bamberg, S. C.	Heartnut	H	6	9.0g	2.8g	0.5g	2.4g	234kg	31.1	17.8	85.6	3	5	3	4	4	15	0	3	13	18	68
L. J. Bryant & Son	Newark, N. Y.	Siebold walnut	S	7	6.6g	1.7g	0.9g	1.1g	138kg	26.1	55.8	66.3	2	4	4	4	7	10	2	3	10	18	64
O. D. Faust	Bamberg, S. C.	Siebold walnut	S	8	8.7g	1.9g	0.0g	1.7g	142kg	22.5	0.0	88.8	3	3	4	4	7	16	0	1	7	18	63
R. Bates	Jackson, S. C.	Cording walnut	H x P		12.2g	2.8g	1.3g	2.2g	419kg	22.6	46.4	78.2	5	3	3	4	0	13	2	2	8	20	60
R. Bates	Jackson, S. C.	Siebosian walnut	P x S		13.0g	2.2g	0.0g	0.5g	370kg	16.9	0.0	22.7	1	0	3	4	0	0	0	1	3	15	27

The abbreviations under the species column are: **H for heartnut (Juglans cordifornia), S for** Siebold walnut (Juglans Sieboldiana), HxP for heartnut x Persian walnut hybrid (Juglans cordifornis x regia), PxS for Persian walnut x Siebold walnut hybrid (Juglans regia x Sieboldiana). In the case of hybrids the species first named **is the pistillate parent.**

PECANS—13 VARIETIES

Some very good northern pecans were sent in to the 1918 contest and two of them are deemed worthy of experimental propagation. One of these Dunn No. 1, had a particularly delicious flavor and the other the Koontz, was also a desirable nut. They are not large but are almost exactly the size of the Moore pecan, a southern variety now attracting a good deal of attention.

Specimens of three nuts of larger size were received, the Norton, McCallister and Kline, but not in sufficient quantity to test. The weights are given for reference. Tests of nine standard southern pecans are also shown. It will be noticed that the best pecans sent to the 1919 contest compare very favorably with these fine southern pecans, only the Schley being shown superior. The northern pecans are generally smaller than the southern, have lighter colored shell and lighter colored kernel, flavor every bit as good, and shell just as thin. The prize winning nuts and the prizes awarded are shown in the table on page 158.

The results of tests of southern pecans is inserted with some hesitation. These pecans are judged by the same score cards as are the northern pecans which is the one used for hickories. Inasmuch as the pecans, both northern and southern, are judged by the same standards, it is hoped that the figures may be of some value. The writer makes no claim to being an expert on the southern pecan and does not wish these figures taken as his opinion on the relative merits of southern pecans, which have been grown in orchard form long enough so that regularity of bearing, size of crops, resistance to disease, etc., have been determined to a considerable extent. These are of such importance to the practical pecan grower as to overbalance to quite an extent the merits of the nut itself which are the only qualities that can be considered in a nut contest.

Other pecans received from:

G. M. Brown, Van Buren, Ark.

J. H. Burkett, Clyde, Texas. (Young grafted tree).

Mrs. W. W. Evans, Blackwell, Okla.

Mr. J. B. Shultz, Fulton, Ark.

Snyder Bros., Center Point, Ia. (Pumfrey 1st, 2nd).

PECANS

NAME	ADDRESS	DESCRIPTION	Species	Prize awarded	Average weight of nut	Average weight of kernel	Average weight of kernel that dropped out after cracking	Average weight of kernel that could be easily picked out with fingers after cracking	Average cracking pressure	Proportion of kernel	Cracking quality absolute	Cracking quality commercial	Size 10	Form 5	Color of shell 5	Husking quality 5	Thinness of shell 10	Cracking quality commercial 20	Cracking quality absolute 5	Color of kernel 5	Proportion of kernel 15	Quality of kernel 20	Total points awarded 100
D. K. Dunn	Wynne, Ark.	Pecan No. 1	P	1	5.8g	3.2g	0.0g	3.2g	34kg	55.1	0.0	100.0	4	5	3	5	7	20	0	4	11	20	79
E. J. Koontz	Richards, Mo.		P	2	5.6g	3.1g	0.0g	3.1g	35kg	55.4	0.0	100.0	4	5	4	5	7	20	0	5	11	17	78
J. F. Clifford	Crossville, Ill.	Prolific	P	3	5.0g	2.4g	1.1g	1.7g	53kg	48.0	45.8	70.8	4	4	3	5	6	12	2	5	9	17	77
J. F. Clifford	Crossville, Ill.	Sweetmeat	P	4	4.4g	2.6g	1.3g	2.6g	61kg	59.1	50.0	100.0	3	5	2	5	5	20	2	4	12	17	75
D. K. Dunn	Wynne, Ark.	Pecan No. 3	P	5	6.3g	3.1g	0.0g	3.1g	38kg	49.3	0.0	100.0	4	4	3	5	7	20	0	4	9	18	74
Mrs. Maida R. Wears	Rich Hill, Mo.		P	5	3.1g	1.5g	1.4g	1.4g	21kg	45.3	93.2	93.2	2	4	3	5	8	18	4	5	8	17	74
S. W. Snyder	Center Point, Ia.	Oberman	P	5	3.6g	2.0g	0.0g	2.0g	34kg	55.5	0.0	100.0	2	5	4	5	7	20	0	5	11	15	74
D. K. Dunn	Wynne, Ark.	Pecan No. 2	P	6	5.4g	2.7g	0.0g	2.7g	31kg	50.0	0.0	100.0	4	5	3	5	7	20	0	4	9	15	72
A. G. Shanklin	Clemson College, S.C.		P	7	5.1g	2.6g	0.4g	2.6g	64kg	51.0	15.4	100.0	4	4	4	5	5	20	0	4	10	15	71
Mrs. Addie G. Evans	Blackwell, Okla.		P	8	5.0g	2.0g	0.0g	2.0g	35kg	40.0	0.0	100.0	4	4	3	5	7	20	0	5	7	15	70
		Norton	P		8.1g																		
		McCallister	P x L		17.7g																		
		Klein	P x L		22.0g																		

Standard Southern Varieties

NAME	ADDRESS	DESCRIPTION	Species	Prize awarded	Average weight of nut	Average weight of kernel	Average weight of kernel that dropped out after cracking	Average weight of kernel that could be easily picked out with fingers after cracking	Average cracking pressure	Proportion of kernel	Cracking quality absolute	Cracking quality commercial	Size 10	Form 5	Color of shell 5	Husking quality 5	Thinness of shell 10	Cracking quality commercial 20	Cracking quality absolute 5	Color of kernel 5	Proportion of kernel 15	Quality of kernel 20	Total points awarded 100
		Schley	P		9.5g	5.9g	0.0g	5.9g	29kg	62.1	0.0	100.0	6	5	3	5	7	20	0	3	13	20	82
		Burkett	P		8.6g	4.8g	0.0g	4.8g	28kg	55.8	0.0	100.0	5	5	3	5	7	20	0	4	11	18	78
		Moore	P		5.8g	2.9g	0.0g	2.9g	25kg	50.0	0.0	100.0	4	5	4	5	8	20	0	4	9	18	78
		Alley	P		8.3g	5.4g	0.0g	5.4g	39kg	54.3	0.0	100.0	5	5	3	5	6	20	0	3	11	19	77
		Delmas	P		10.1g	4.9g	0.0g	4.9g	98kg	48.5	0.0	100.0	6	5	3	5	4	20	0	4	9	20	76
		Moneymaker	P		7.8g	3.5g	0.0g	3.5g	20kg	44.9	0.0	100.0	5	5	4	5	8	20	0	3	8	18	76
		Pabst	P		8.7g	3.9g	0.0g	3.9g	59kg	44.8	0.0	100.0	5	5	4	5	5	20	0	3	8	19	74
		Stuart	P		8.8g	4.1g	0.0g	4.1g	56kg	46.6	0.0	100.0	5	5	3	5	5	20	0	3	8	18	72
		Vandeman	P		8.1g	8.9g	0.0g	3.9g	96kg	48.2	0.0	100.0	5	5	3	5	4	20	0	3	9	18	72

The abbreviations used under the species column are: P for pecan (**Carya pecan**), PxL for pecan x shellbark hybrid (Carya pecan x laciniosa).

HAZELS—6 ENTRIES

This is the first time I have had opportunity of testing Rush hazel which was found by Mr. Rush 35 years ago, but which, so far as I know, has never been propagated in the sense in which the word is used in the contests where it means listed in the catalog of some nurseryman who is prepared to furnish grafted or budded or layered plants. The value of this hazel is now being recognized and doubtless it will not be long that this will be the case for it is by far the best American hazel now known. The prize winning nuts and the prizes awarded are shown in the table on page 160.

Following the list of American hazels are 9 varieties of Mr. Conrad Vollertsen's, Rochester, N. Y., most of them of German origin. These are given with their German names. These names are given here for convenience for readers and only for that, for they violate one of the rules followed in naming nuts. They will be referred to the nomenclature committee at its next session. Following Mr. Vollertsen's hazels are five standard market hazels grown on the Pacific coast which are noted as matters of record.

It will be noted that the White Aveline hazel has been placed higher than the Barcelona when judged by the score card used. Inasmuch as orchards of White Aveline hazels in the Pacific northwest are being replaced by Barcelona and Duchilly because White Aveline nuts are too small to be saleable commercially, it was questioned as to whether the score card was not at fault and whether much more emphasis should not be put on size and less on quality than is the case with the score card used. Inasmuch as the same score card has been used for all nuts except where it seemed entirely unadapted (because when this was done the figures have a value they otherwise would not in expressing the relative value of each species) it seems very desirable this common score card be retained for as many nuts as possible. There are some notable instances where fruits commercially important do not rank highest in quality, e. g., the Elberta peach, Ben Davis apple, and Kiefer pear, therefore it is thought better not to emphasize size too strongly in the case of hazels. It is only fair to state, however, that much less work has been put on judging hazels than on some other nuts and perhaps our ideas will have to be revised later.

HAZELS

NAME		DESCRIPTION	Species	Prize awarded	Average weight of nut	Average weight of kernel	Average weight of kernel that dropped out after cracking	Average weight of kernel that could be easily picked out with fingers after cracking	Average cracking pressure	Proportion of kernel	Cracking quality absolute	Cracking quality commercial	Size 10	Form 5	Color of shell 5	Husking quality 5	Thinness of shell 10	Cracking quality absolute 20	Freedom from fiber 5	Color of kernel 5	Proportion of kernel 15	Quality of kernel 20	Total points awarded 100
J. F. Jones	Lancaster, Pa.	Rush hazel	Am	1	2.1g	1.0g	1.0g	1.0g	39kg	45.7	100.0	100.0	3	4	3	5	7	20	2	4	12	18	78
Miss Louise Littlepage	Bowie, Md.		Am	2	2.7g	.8g	.8g	.8g	59kg	28.3	100.0	100.0	4	3	2	5	3	20	4	4	2	15	62
J. W. Strassel	Rockport, Ind.		Am	2	1.9g	.7g	.7g	.7g	36kg	36.5	106.0	100.0	2	3	1	5	8	20	3	1	7	12	62
Mrs. Priscilla Randall	Freeport, O.		Am	3	1.8g	.4g	.4g	.4g	51kg	22.7	100.0	100.0	2	3	2	5	5	20	4	5	0	15	61
Luther W. Vest	Blacksburg, Va.		Am	4	1.8g	.6g	.6g	.6g	49kg	31.8	100.0	100.0	2	3	0	5	5	20	2	2	4	15	58
William H. Kuhne	Woodbury, Conn.		Am	5	1.4g	.4g	.4g	.4g	50kg	27.9	100.0	100.0	1	3	3	5	5	20	1	3	2	10	53
Conrad Vollertsen	Rochester, N. Y.	Medium Long	?		2.2g	.9g	.9g	.9g	46kg	41.4	100.0	100.0	3	5	5	5	6	20	3	5	9	20	81
" "	" "	Italienische Rothe Zeller	P		2.8g	1.1g	1.1g	1.1g	57kg	40.4	100.0	100.0	4	5	5	5	4	20	3	4	9	20	79
" "	" "	Lambertnuss Rothe	M		2.3g	.8g	.8g	.8g	42kg	35.6	100.0	100.0	3	5	5	5	7	20	4	4	6	18	77
" "	" "	Merveille de Bollwiller	M		2.5g	.9g	.9g	.9g	49kg	37.4	100.0	100.0	3	5	4	5	5	20	4	4	7	18	75
" "	" "	Lambertnuss Weisse	M		2.2g	.9g	.9g	.9g	60kg	40.5	100.0	100.0	3	5	5	5	3	20	3	3	9	18	74
Conrad Vollertsen	Rochester, N. Y.	Gunzelebener Zeller	P		1.7g	.8g	.8g	.8g	58kg	20.4	100.0	100.0	1	5	4	5	4	20	1	3	9	20	72
" "	" "	Althaldensleben	Av		1.8g	.7g	.7g	.7g	63kg	37.7	100.0	100.0	2	5	5	5	3	20	4	5	7	15	71
" "	" "	Grosse Kugelnuss	Av		1.9g	.8g	.8g	.8g	70kg	41.6	100.0	100.0	2	5	4	5	1	20	2	3	10	15	67
" "	" "	Minna's Zeller	P		2.1g	.7g	.7g	.7g	49kg	32.6	100.0	100.0	3	5	5	5	5	20	1	3	5	15	67
J. F. Jones	Lancaster, Pa.	Daviana			3.1g	1.6g	1.6g	1.6g	33kg	51.0	100.0	100.0	5	5	4	5	8	20	4	3	15	20	89
" " "	" "	White Aveline			2.1g	1.1g	1.1g	1.1g	26kg	49.3	100.0	100.0	3	5	3	5	10	20	5	3	14	20	88
" " "	" "	Noce Lunghe			4.8g	2.1g	2.1g	2.1g	79kg	42.5	100.0	100.0	10	5	4	5	0	20	4	8	10	18	79
" " "	" "	Imperial			3.5g	1.2g	1.2g	1.2g	51kg	33.1	100.0	100.0	6	5	4	5	5	20	2	3	5	18	78
" " "	" "	Barcelona			4.3g	1.8g	1.8g	1.8g	42kg	41.8	100.0	100.0	8	5	3	5	7	20	2	0	10	20	70

The abbreviations used under the species column are: Am for American hazel (Corylus Americana). Av for Corylus Avellana, a European species. M for Corylus maxima, a European species, P for Corylus pontica, a European species. It seems quite probable that many of the European varieties noted above are hybrids and not pure species. The species identification of the European varieties are those of Mr. Conrad Vollertsen.

PERSIAN WALNUTS—5 ENTRIES

The prize winning nuts and the prizes awarded are shown in the table on page 154.

This is the first time that I have had opportunity to test some of the propagated Persian walnuts. The results shown are given for what they are worth. A sufficient number of Persian walnuts have not as yet been examined to enable us to determine the constants so that they are as valuable as they will be later, and as they are on the hickories, black walnuts, and butternuts where hundreds of nuts have been examined. Consequently, conclusions based on the figures in the table should be conservatively drawn. The position of the Franquette at the bottom of the list of the propagated nuts it is believed will be materially changed with the redetermination of the constants that an examination of a large number of nuts would require.

OBSERVATIONS

The number of entries in the 1919 contest was about 50% greater than in 1918. No hickories, no black walnuts or butternuts deemed worthy of experimental propagation appeared as was the case in 1918, but on the other hand, two pecans, the Dunn No. 1 and Koontz, it is believed, are well worth while propagating experimentally even though the Dunn nut comes from a somewhat more southern section than the other northern pecans now being propagated. The need for additional heartnuts makes it seem advisable to propagate experimentally the Stranger heartnut, even though it comes from Jackson, S. C., a section so far south that the southern pecan grows and bears well. The contest has helped to bring out the value of the Rush hazel, which has been propagated experimentally for a long time but which, so far as I know, has never been offered to the public by nurserymen.

The following standards for hickories have been established: The largest nut found so far is still the Mott shellbark, which Dr. Morris found a number of years ago and which weighs 29.6g. The Vest hickory, which among the seemingly pure shagbarks, had the record of the thinnest shell up to the 1918 contest, has been surpassed by the Beam No. 1 of the 1919 contest, which takes but 33kg to crack the shell. The figure is surpassed by one bitternut hybrid the Beaver 29kg, and by the Hatch bitternut 19kg, and the Halesite bitternut 13kg. The Vest of the 1914 crop is still the seemingly pure shagbark with the largest percentage of kernel 57.7%. This is surpassed by the Hatch bitternut 65.0%, and the Halesite bitternut 69.0%. No hickory has been found to surpass the Vest in the excellence of flavor of the kernel. One hickory, the Barnes, 1919 contest, showed 100% cracking quality.

The following standards for black walnuts have been established. The Armknecht No. 2 which held the record last year has been surpassed by the Werner with a weight of 30.4g. The thinnest shelled one is still the Alley of the 1918 contest, with a cracking pressure of 110kg. although the Ten Eyck of the 1918 contest was only slightly higher. 120kg. The record for the greatest proportion of kernel is still with the Ten Eyck of the 1918 contest 36.4%. The Ten Eyck black walnut exhibited in 1919 had no such records of thinness of shell or proportion of kernel. The Stabler is believed to be the best cracker but the Alley of the 1918 contest showed 100%. The Bomberges black walnut of the 1919 contest showed unusually fine quality of kernel and is believed to hold the record for quality of kernel so far.

The following standards for butterjaps (i. e., butternuts, Japan walnuts and their hybrids) have been established. The Wasson butternut which held the record for size heretofore 18.8g has been surpassed by two nuts Pumfrey No. 2, 19.5g and Truman No. 4, 22.6g. The same high cracking quality among the pure butternuts noted last year still continues. The Ritchie heartnut of the 1918 contest still holds the record for percentage of kernel, 32.7%. One pure butternut, the Kuhne of the 1919 contest, with 19% kernel has been found. The Aiken butternut 200kg cracking pressure is the thinnest shelled pure butternut yet found. The thinnest shelled Japan walnut yet found is the Wilson Seibold walnut of the 1919 contest, 75kg cracking pressure.

The following standards for pecans have been established (including the pecan x shellbark hybrids which generally resemble pecans in flavor and appearance and would be classed with them). Largest, the Klein. 22.0g in weight. Of the pure northern pecans the Norton, 8.1g in weight is the largest. Of the pure southern pecans tested the Delmas 10.1g in weight is the largest. Of the northern pecans the greatest percentage of kernel yet found is the Clifford "Sweetmeat" of the 1919 contest, 57.6% of kernel, followed closely by the Koontz, 56.1% and the Dunn, 55.5%. Of the southern pecans the Schley, 62%, leads.

The thinnest shelled northern pecan yet tested is the Wears of the 1919 contest. 21kg cracking pressure; the thinnest southern pecan is the Burkett. 27kg followed closely by the Schley 29kg. The finest flavored among the northern pecans is Dunn No. 1, which has a kernel which is exceptionally delicious. The finest flavored among the southern pecans is the Schley.

The following standards for hazels have been established. The largest American hazel yet found is the Littlepage 2.7g but the Rush, although a smaller nut has a larger kernel 1.0g against .8g for the Littlepage. The Rush also has a greater proportion of kernel, 45.7%, than any other native hazel yet tested or any foreign one excepting the White Aveline which has 49.3%. The thinnest shelled American hazel is the Rush 39kg and the thinnest shelled foreign one. the White Aveline 26kg.

Those who have given the matter consideration are thoroughly convinced of the great possibilities of systematic hybridization of nut trees. Work of this kind will have to be carried on according to carefully thought out plans, the details of which are not yet quite clear in all particulars. The facts brought out by this contest have added to our knowledge of what may be expected from our work. Take the hickory for example; we have shellbark hickory nuts nearly three times the size of the best southern pecans; we have bitternut hickory nuts with a proportion of kernel greater than that of any pecan and with shell so thin. that they can be cracked with less pressure than any pecans I have ever seen; we have in the best shagbarks. flavor of kernel unsurpassed in any nut. Theoretically, it should be possible to produce nuts in which these qualities are combined to a large degree. Similar possibilities exist with the butternut and the Japan walnut where it is seemingly possible to produce nuts in which the qualities of both will be combined and get smooth. thin-shelled butternuts or well flavored Japan walnuts or desirable butterjaps. as I am inclined to call them.

An inspection of the table of hickories show that 4 out of the 28 receiving 68 points or over, are certainly hybrids. There are a number of others where it seems very probable that they are hybrids. There are a number of facts to suggest that some of our very thin shelled hickories, which at first sight seem to be shagbarks, are hybrids of which the shellbark or mockernut is one parent. Why the offspring of such thick shelled nuts as the shellbark or the mockernut and the shagbark should be thin shelled, is more than I can imagine. We have two occurrences however which are significant. On the list of Japan walnuts two hybrids of the Persian and Japan walnut, Cording and Siebosian are noted. I have never tested a Persian walnut where the cracking pressure runs much over 40kg and it is rather unusual for a Japan walnut to run much over 200kg, yet Cording is 419kg, a strength of shell greater than that of any other nut sent into the contest this year and which is only found among black walnuts and shellbark hickories. Siebosian is not very much less. If two comparatively thin shelled nuts will produce an offspring with a shell so much thicker than either parent, it does not seem more impossible for two thick shelled nuts to produce thin shelled offsprings.

NORTHERN NUT GROWERS ASSOCIATION

REPORT

OF THE PROCEEDINGS AT THE

ELEVENTH ANNUAL MEETING

WASHINGTON, D. C.

OCTOBER 7 AND 8, 1920

NORTHERN NUT GROWERS ASSOCIATION

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Snyder, D. C., Center Point (Linn Co. Nurseries)

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Sharpe, James, Council Grove, (Morris Co. Nurseries)

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SOUTH CAROLINA
Shanklin, Prof. A G., Clemson College

TEXAS
Burkett, J. H., Nut Specialist, State Department of Agriculture, Clyde
Trumbull, R. S., Agricultural Agent, El Paso & S. W. System Morenci Southern R. R. Co., El Paso

VERMONT
Holbrook, F. C., Brattleboro

VIRGINIA
Parish, John S., University

WASHINGTON
Baines, William, Okanogan

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Mish, A. F., Inwood

WISCONSIN
Lang, Robert B., Racine, Box 103
Patchen, Dr. G. W., Manitowoc

†Honorary Member.

*Life member.

CONSTITUTION

ARTICLE I

Name. This society shall be known as the NORTHERN NUT GROWERS ASSOCIATION.

ARTICLE II

Object. Its object shall be the promotion of interest in nut-bearing plants, their products and their culture.

ARTICLE III

Membership. Membership in the society shall be open to all persons who desire to further nut culture, without reference to place of residence or nationality, subject to the rules and regulations of the committee on membership.

ARTICLE IV

Officers. There shall be a president, a vice-president, a secretary and a treasurer, who shall be elected by ballot at the annual meeting; and an executive committee of six persons, of which the president, the two last retiring presidents, the vice-president, the secretary and the treasurer shall be members. There shall be a state vice-president from each state, dependency, or country represented in the membership of the association, who shall be appointed by the president.

ARTICLE V

Election of Officers. A committee of five members shall be elected at the annual meeting for the purpose of nominating officers for the following year.

ARTICLE VI

Meetings.—The place and time of the annual meeting shall be selected by the membership in session or, in the event of no selection being made at this time, the executive committee shall choose the place and time for the holding of the annual convention. Such other meetings as may seem desirable may be called by the president and executive committee.

ARTICLE VII

Quorum. Ten members of the association shall constitute a quorum, but must include two of the four elected officers.

ARTICLE VIII

Amendments. This constitution may be amended by a two-thirds vote of the members present at any annual meeting, notice of such amendment having been read at the previous annual meeting, or a copy of the proposed amendment having been mailed by any member to each member thirty days before the date of the annual meeting.

BY-LAWS

ARTICLE I

Committees. The association shall appoint standing committees as follows: On membership, on finance, on programme, on press and publication, on nomenclature, on promising seedlings, on hybrids, and an auditing committee. The committee on membership may make recommendations to the association as to the discipline or expulsion of any member.

ARTICLE II

Fees. The fees shall be of two kinds, annual and life. The former shall be two dollars, the latter twenty dollars.

ARTICLE III

Membership. All annual memberships shall begin either with the first day of the calendar quarter following the date of joining the Association, or with the first day of the calendar quarter preceding that date as may be arranged between the new member and the Treasurer.

ARTICLE IV

Amendments. By-laws may be amended by a two-thirds vote of members present at any annual meeting.

PROCEEDINGS
AT THE
ELEVENTH ANNUAL CONVENTION OF THE NORTHERN NUT GROWERS ASSOCIATION

Washington D. C.

October 7 and 8 1920

The Association was called to order at 10 a. m. Thursday October 7th by the President, Hon. William S. Linton, of Saginaw, Michigan, in the auditorium of the New National Museum.

The President: It has been something of an effort for me to reach here at ten o'clock in order to meet the obligations of the program as it was only a few days ago that I was in lower California very near the Pacific Ocean in old Mexico. As I turned about to come back toward the East the thought came into my mind that I must be in Washington D. C. at the annual meeting of the Northern Nut Growers Association at ten o'clock on Thursday morning October 7. Traveling over three thousand miles I was fortunate enough to get here just two minutes before the ten o'clock hour so the connections you will see were close. The paper that your president is to present comes at a later place on the program so we will proceed with the business session at once. The first thing on the program is the report of the Secretary and Treasurer.

RECEIPTS

	Dec. 1, 1919 to Dec. 31, 1919	Jan. 1, 1920 to Sep. 30, 1920	Total	Balance
Balance on hand date of last report, Dec. 1, 1919: Special hickory prize $25.00, Life membership $25.00, For regular expenses $106.53				$156.53
From annual members including joint subscription to the American Nut Journal	$ 25.25	$368.10	$393.35	
		9.00	9.00	
Reports		25.00	25.00	
Contributions for prizes:				
Contribution for special hickory prize		25.00	25.00	
Bulletin No. 5		57.60	57.60	
	$ 25.25	$484.70	$509.95	509.95
				$666.48

EXPENDITURES

American Nut Journal, their portion of joint subscriptions	$ 22.00	$ 98.00	$120.00	
1919 Convention	8.75	137.68	146.43	
Printing Bulletin No. 5		63.50	63.50	
Clasp envelopes for Bulletin No. 5 and for reports		30.20	30.20	
Stationery, printing and supplies		116.45	116.45	
Postage, express, etc.		46.04	46.04	
Prizes 1919 contest (not all sent out before Oct. 1)		13.00	13.00	
Special hickory prize Eugene J. Clark, Ludlow, Mass.		25.00	25.00	
Advertising 1920 Nut Contest (not all paid before Oct. 1)		30.60	30.60	
	$ 30.75	$560.47	$591.22	591.22
	$ 30.75	$560.47	$591.22	
Balance on hand Oct. 1, 1920				591.22
Special hickory prize				25.00
Life membership				25.00
For regular expenses				25.26
				$666.48

Verified by

C. P. CLOSE,
C. A. REED,
Auditing Committee.

The above are records of receipts and expenditures for 10 months and are about 82% of those for the period covered by the previous report, 2 years 3 months. There has been an earnest attempt to carry on the work of the Secretary-Treasurer in a more aggressive manner than before. A bulletin aiming to give up to date information on nut growing, Bulletin No. 5, has been issued and has gone well. While it has been sold, no attempt has been made to make money on it but simply to make it pay its way and apparently it is going to do that and assist in spreading information about the work of the Association.

Sixty-six new members have joined the Association since the date of the last meeting, making 476 since organization, of which we have 199, and of whom 277 have dropped out. A few former members have joined since the date of the last report which apparently accounts for the strange fact that increase in membership (128 to 199) is greater than the number of new members.

Following out the plan outlined at the Battle Creek Convention, the work of the Secretary-Treasurer has begun to be divided, the undersigned taking the duties of Treasurer and the Nut Contests and Dr. Deming taking the Conventions and the work of the Secretary proper until the expected action of the present convention shall formally divide the work of the Secretary Treasurer and create the offices of Secretary and Treasurer.

Respectfully submitted,
WILLARD G. BIXBY,
Secretary-Treasurer.

THE PRESIDENT: This is a very good report, complete in every detail, and unless other action is desired, it will be received and recorded in the minutes of the meeting.

Mr. Reed, you are chairman of the committee that had in charge the tree-planting bill in order that it might be made uniform throughout the country. Have you a report to make?

MR. REED: Mr. President, the committee members have been over that individually but have not had an opportunity to discuss it together. If a full report can be had a little later I think that would be more satisfactory. So far as I have been able to go into it the law seems to about cover the ground. I could not make any suggestions as to how it could be improved. I happen to know that the author of the bill, who is our president, has been called upon by several other states to discuss such a law for those states, and I think he is in the best position to tell us if there are any holes in it. If we can have the consent of the house we will defer a full report until we can discuss the matter with our president and with our committee as a whole.

THE PRESIDENT: We will take that course unless there are objections.

The communications received by the acting secretary will be filed and printed in the proceedings. If there are no vice-presidents present who are prepared to make reports that order will be passed. At this time should come the appointment of committees but I think it would be well to defer that business until we can consult as to the membership of the committees. The next in order will be some remarks by Mr. Littlepage about the proposed afternoon excursion.

THE ACTING SECRETARY: The speakers are Dr. Van Fleet, Mr. Littlepage and Professor Close. I have here the resume of Dr. Van Fleet and I think that it would be better perhaps to read the report of Dr. Van Fleet at once as it may have some bearing on the remarks of Mr. Littlepage and Professor Close.

CHESTNUT WORK AT BELL EXPERIMENT PLOT

Dr. Walter Van Fleet, Glendale, Maryland

Our breeding work with chestnuts began as far back as 1894 when pistillate blooms of the Paragon variety, then a novelty just coming into use, were dusted with pollen from a native sweet chestnut bearing good-sized nuts. The Paragon stigma were protected from the influence of other pollen by bagging and gave a good set of fruits. The idea was to improve the quality of the Paragon nuts even at the expense of size. The resulting seedlings were grown at Little Silver, New Jersey, and rapidly ran up into good-sized trees, coming into bearing twelve years later. In fruit and tree characters they proved a complete blend of the parent species, the nuts being double the size of the wild parent and of sweet, rich quality. The trees were very shapely and bid fair to become extremely productive but a year or two later were all attacked by the dreaded blight or bark disease, then spreading from its original starting point in Long Island. The work of destruction was very rapid and by the third year all were hopelessly crippled, but a few individuals continued to send up suckers as late as 1916.

The success of this pollination experiment encouraged the writer to attempt breeding the dwarf early-bearing chinquapin with the large-fruited foreign varieties in the hope of securing hybrids with nuts of fair size and good quality that might come quickly into bearing. As the chinquapin does not naturally grow in Northern New Jersey, and plants were rarely offered by nurserymen, recourse was had to growing them from seed and a quantity of newly collected nuts were furnished by a friend in Washington in 1899. It required three years time to bring the seedlings into fruit and it was not until 1903 that a start was actually made in the work of hybridization. A selection was made of a compact dwarf bush that bore very sweet nuts of a good size for the species and gave promise, which was later fulfilled, of becoming very prolific. The male, or staminate tassels were carefully removed each day before matnrity and, to ward off undesired foreign pollen, a cloth tent was used to cover the bush in addition to bagging many of the flowering branches. Pollen for crossing was secured from Paragon and Numbo, of the European species, and of several named varieties of Japan chestnut including Parry's Giant, Killen and Hale, and in addition a few blooms were intentionally fertilized with pollen from local sweet chestnut trees. Nearly one hundred hybrid seedlings resulted from the work in two succeeding seasons, some of which came into bearing in 1908, just as the *Endothia* blight began to invade New Jersey. The hybrids between the chinquapins and native and European chestnuts were quickly infected, but those with Japan varieties appeared far more resistant. All work with the susceptible native and Europeans ceased, but crosses with Japans and the Chinese chestnut, *Castanea Molissima,* have been continued until now there are over eight hundred in existence. In late years we have used the Southern creeping chinquapin, *C. alnifolia,* as a seed parent to some extent, as it appears more resistant than the common species, *C. pumila,* though it cannot be considered immune. The southern chinquapin is hardy in the North, bears good-sized, sweet nuts for its type, but is very late in ripening.

The Rush chinquapin, and other large-fruited, tall growing varieties have also been used to some extent. The resulting hybrids make handsome trees of rapid growth and bear profuse crops of very attractive nuts, but are greatly injured by blight. As experience accumulated it was found that the extreme caution used in the earlier trials to keep out foreign pollen were scarcely needed and that merely covering the pistillate blooms as soon as they could be distinguished with cotton batting is all that is necessary, and also that hybrids may be produced with considerable certainty in open pollination if the tree or branch is kept entirely free from staminate tassels and the selected pollen is promptly applied as soon as the stigmas become receptive.

Quite a number of chance or self-pollinated seedlings from choice hybrids have been raised in the hope that their good qualities might be perpetuated and the trouble and expense of grafting largely obviated but, as with most other hybrids between distinct species, the seedlings lacked sufficient uniformity to be of especial value. A few individuals turned out superior to the parent but on the whole degeneracy, from the nut-producers standpoint, appears among seedlings of hybrid chestnuts.

In 1909 the unfruited chinquapin hybrids, 68 in number, were transferred to Arlington Farm, Virginia, and two years later Bell Experiment Plot was established near Glendale, Maryland, largely for the purpose of developing blight-resistant varieties of chestnuts as far as this can be done by breeding and testing of wild forms. There are now over 2000 hybrids and seedlings of species at Bell ranging from one to ten years of age. Of the original trees planted at Arlington about 20 remain. They have formed handsome trees twenty feet high with tops almost as wide in diameter and have borne many profuse crops of nuts mostly of good quality and from three to six times as large and heavy as those of the parent chinquapin. All have been attacked by blight, the most promising one only this spring, after thirteen years of resistance to this virulent disease. All the hybrids carrying blood of native or European chestnuts were quickly killed, but those with the Japanese species as a pollen parent are still growing vigorously and bearing well, though considerably disfigured by blight.

Of the various species used the native sweet chestnut, *Castanea Americana*, and the European, *C. vesca*, appear entirely useless in breeding for disease resistance, as the hybrids are destroyed by the blight fungus as soon as, or even before, they reach bearing age. The tall, or tree, forms of native chinquapin, sometimes grouped under the botanical name of *Castanea arborea* but which appear to be only natural hybrids between the sweet chestnut and the bush chinquapin, may also be regarded as useless for the purpose. The hybrid progeny show slight powers of recuperation but, in our plantings, do not sufficiently recover to make useful trees. The Rush chinquapin sometimes resists infection under natural conditions for several years but quickly succumbs when attacked, but its hybrid seedlings develop practically no resistance. The common bush or dwarf chinquapin, *Castanea pumila*, widely distributed over the Atlantic States, is not as readily infected by blight as the chestnut, many individuals under cultivation and in the wild resisting attack for an indefinite time, while the creeping species of Florida and South Georgia, *C. alnifolia*, appear practically immune in nature but succumb to artificial inoculation with the blight virus The smooth bark and shrubby forms of these dwarf chinquapins probably account to a very great extent for the limited damage caused by blight under natural conditions.

Next in degree of resistance comes the wooly-twigged Chinese chestnut, *C. molissima*. There are established at Bell Experiment Plot over nine hundred Molissima trees grown from nuts collected near Tien-Tsin, China, in 1911. These trees in their eighth year of growth havee borne excellent nuts, rather larger than those of our native species, in some quantity for three successive years though, owing to extensive locust injury last season, there is practically no crop this year. The trees average twelve or more feet high and are thrifty growers when not too greatly afflicted by blight. No summary of disease injury has been taken, but probably over 80 per cent of the trees show infection many of which are making attempts to heal which are often very successful. This species is native to Eastern China and has long been accustomed to the *Endothia* fungus, developing in the course of time a very considerable degree of resistance to it. From present appearances the Chinese chestnut may be grown in orchard form with no greater loss from disease than the pear from its particular form of blight. It hybridizes well with the Japan chestnut and both of the dwarf chinquapins, but this progeny is not yet sufficiently developed to warrant judgment.

Castanea crenata, the familiar Japan chestnut, appears everywhere to show greater blight resistance than any other species that has been tried out and is therefore the most hopeful parent to be used for developing a useful race of disease-resistant hybrids and cross-breeds. It has the further merit of bearing very profuse crops of large nuts at an early age, but they are often lacking in quality, being usually harsh to the taste in the raw state though palatable when cooked. A few varieties bear well-flavored nuts, but these appear to be hybrids with our native species and are notably less resistant to blight. Pure Japan varieties grown from imported nuts are rarely injured by blight, and by many are regarded as immune, but those grown from nuts produced in situations exposed to the effects of native pollen are occasionally attacked and even killed outright by the *Endothia* fungus. It has considerable power to transmit its resisting qualities to its hybrids with the chinquapins, and a few individuals among the latter appear to retain resistance to such a degree that we may yet find among them some of the best nut-producing chestnut varieties of the future.

From the purely horticultural standpoint these hybrids between chinquapins and chestnut species must be considered as most striking successes. If this terribly destructive disease, probably the most virulent that afflicts any tree in the temperate climate, could be controlled there would be little need to look further for varieties suited for commercial and home culture, some of which can be as readily grown as peach trees and come into bearing as young. As the situation stands we must search further for individuals that combine good cropping capacity with practical disease-resistance.

At this writing the most promising outlook appears among selected seedlings of pure *Crenata* blood, or hybrids of this species that have again been pollinated with resistant Japan varieties. There are at Bell many seedlings of both these types of great attractiveness and promise.

Five successive generations of selected *Crenata* seedlings have been grown since 1904, quite a number producing their first nuts the year succeeding germination. This unusual precocity is no indication of merit, as it tends to stunt the trees. The most promising individuals seldom bear until three or four years old by which time the trees have attained fair size. No high quality has yet been attained among the nuts of the pure strains, but it is quite evident where there is a dash of chinquapin blood. The nuts are, however, large, attractive and excellent for cooking or roasting, and moreover, ripen uniformly in September and early October, practically without the aid of frost. As opportunities for natural infection lessen from the dying out of our stands of native chestnut the Oriental chestnuts and their hybrids will be more extensively planted and may experience little difficulty in combating disease. Owing to the readiness with which seedlings can be grown abundant new varieties will arise in time, even though they do not now exist, that will meet all reasonable requirements of the planter and it is to be anticipated that the production of edible chestnuts will at no distant day be placed on a stable basis.

Aside from its usefulness as a nut tree the value of our stand of native chestnuts, though already half destroyed, can scarcely be estimated. Every one knows the ease with which a healthy chestnut woodland reproduces itself by sprouts and the extreme value of its timber for posts, telegraph and telephone poles, for furniture and for tanning extracts, now made from both bark and wood. We scarcely have a forest tree as useful, but if some natural handicap, not yet in sight, does not stay the spread of the blight fungus, our much valued chestnuts appear to be doomed. A few small colonies of diseased, but living sweet chestnut trees, numbering scarcely fifty, have been located in New York City parks and neighboring localities in Long Island, carrying infection at least eighteen years old, where the accompanying stands have completely vanished. This affords the single ray of hope amid the otherwise complete destruction marking the spread of blight. In the hope that the marked resistance shown by these scarred veterans can be transmitted seedlings have been raised and scions established at Bell from the most promising individuals, and on this slender chance for perpetuating this prized species in its native habitat we must, for the present, rest content.

Recently there has been brought to light in the interior of China a chestnut species that may restore our timber production of this most desirable wood if it should prove immune to disease. Unlike other Old World chestnuts, which form relatively small trees, this species, known as *Castanea Vilmoriniana*, grows eighty to one hundred feet high with a straight, symmetrical trunk well adapted for all timber uses. The nuts, according to the scant herbarium material that has reached this country, are of little consequence, except for propagation as they are only slightly larger than those of our wild chinquapins. This species is now established at the Arnold Arboretum near Boston, Massachusetts, and scions worked on *C. Molissima* stocks are now vigorously growing at Bell Experiment Plot, making fine upright shoots. The reaction of *C. Vilmoriniana* to blight has not been tested owing to the scarcity of material in this country, but it is fervently to be hoped that the species will resist the disease. No infections have occurred in several years exposure either at Boston or at Bell. Should the much desired resistance be established rapid propagation of the species by seed and scions, and an extended test for forestry purposes, would be in order.

The breeding experiments at Bell must be regarded as about the only constructive attempt in existence to replace a most highly prized nut and timber that is being swept from the face of the earth. Unless unforseen natural conditions should stay the ravages of blight our chestnut stands will vanish, most likely within the view of the present generation. Although our progress in finding and developing blight-resistants is not as striking as might be hoped something has been accomplished, and the idea of salvaging useful nut and timber chestnuts from available material and developing better ones than now exist should not be abandoned.

THE PRESIDENT: Unless other action is desired this interesting paper will be received and recorded in the proceedings.

MR. T. P. LITTLEPAGE: Mr. President, Members of the Association. I will attempt in a few words to give you some suggestions about your afternoon rambles. There will be a special car assigned exclusively to the nut growers on the tracks at 14th St. and New York Avenue at 12:45, which will take you to Bell Station where you will see Dr. Van Fleet's roses and chestnut orchard. A short walk from there is the old place of Judge Gabriel Duvall, a former Associate Justice of the United States Supreme Court, member of Congress and a great friend of Thomas Jefferson. The unpublished manuscripts of Jefferson show that he took to Judge Duvall a bundle of "paccan" trees, as he called them. Jefferson was one of our great horticulturists and gave the first complete botanical classification of the pecan. Those three big trees that Jefferson gave Judge Duvall are growing out there today and from them are scores of other small trees. I was very much surprised when I read these notes of Jefferson and in looking through Washington's dairy about the same time I read where he said that Thomas Jefferson gave him a bundle of "paccan" trees. Now those of you who are to visit Mount Vernon on this trip look and you will find that three of the most beautiful trees there are pecan trees. Two of them this year have nuts on them one with a rather full crop and one with a light crop. They are undoubtedly the western or northern pecan. They show that in the character of the nuts and bark. When Jefferson was over in Paris he wrote to his friend Hopkins to send him a box of pecans and told him to send them in sand. Those of you who are going to Paris next summer look around and you may find some of Thomas Jefferson's pecan trees. It was perfectly apparent that he wanted those nuts for planting.

After visiting at Bell Station we will take the car up to my place where there really is not much to see. I have thirty acres there of northern pecan trees, twelve acres two years old and they run all the way up to six years of age. Most of the six-year old trees this year set pecans which dropped off about the middle of the summer. They were all full of catkins. One Busseron tree had fifty pecans on it and a number of Major and Butterick trees had pecans but I do not believe they stuck. I had a Stuart which had a sprinkling of pecans on it and they also fell off. I can show you how not to grow trees. Some of them had no care whatever and some had pretty fair care. You can see dead chestnut trees up there showing that the blight is as bad as Dr. Van Fleet says. We find where they stand in the woods for ten years surrounded by trees with the blight and do not blight and the next year die. So the fact that a tree stands in a nursery row and does not blight does not indicate anything. The only hope we have is the work Dr. Van Fleet is doing.

The President: Upon the same subject we will be glad to hear from Professor Close.

Professor Close: I will just take a few minutes in telling some of the things I have been trying to do at home. My work is necessarily on a very small scale. I am away from home so much of the time that some things I start I cannot follow through properly. In grafting, for instance, I get the grafting done as I can do it from time to time in the spring and then I have to leave on a Government trip and am not at home to take care of the growing grafts as I would like to be. While my extension work for the Government is primarily connected with fruit I look into nut work as much as possible. Dr. Van Fleet has given me a number of hybrid chinkapins and this year three of them have fruited for the first time, one being of fairly good size. I have a couple of Japan walnut trees and the surprising thing is that although they were planted in 1910 they are fruiting this year for the first time. Usually those trees begin bearing very early. They have grown rapidly, are probably twenty feet high and have a breadth of equal distance but have been disappointing in that they have been so late in fruiting.

Mr. Littlepage. Do they winter-kill any?

Professor Close: No, they have not winter-killed at all. One was supposed to be a heart nut but both are Sieboldianas. I think the most satisfactory and interesting thing I have is one of these large filberts or hazel nuts. It is a pretty good size for an eastern-grown nut. This is a seedling from New Jersey. I received the scions four years ago and was successful in having three or four of them live and last year they produced for the first time, three years from the graft. They are well filled and of pretty good quality. I have them grafted on some bushes of European type secured from a nursery about 1910, and which until grafted did not fruit at all. After the grafts began blooming last year these bushes have been producing nuts of small size. While the nuts are small they are right interesting.

In connection with the blight resistant chestnuts I will say that last Friday I visited Mr. John Killen of Felton, Delaware. Some of you know that Mr. Killen has been working with nuts for a good many years and has many very interesting things there. He finds that the blight has taken everything except his Japanese seedlings and here (showing specimens) are specimens of two of the Japanese seedlings. This you see is a very large nut. I presume the tree must be twenty years old or more. It is productive and he says it is commercially successful, which means that it blights a little but not very seriously. He has another seedling, a smaller one, that is up to the present time absolutely blight proof. He has planted twenty-five or thirty pounds of these nuts for growing trees for sale and he believes that the seedling from this parent tree will be absolutely free from blight. You will be interested to know that up to the time I was there last Friday he had shipped seven hundred pounds of chestnuts and was receiving twenty-five cents a pound wholesale.

Mr. Littlepage: What is the variety?

Professor Close: They are all seedlings. In fact all of his varieties are dead. He has nothing but seedlings.

Mr. Littlepage: Has that been called to Dr. Van Fleet's attention?

Professor Close: Not that I know of. I doubt if Dr. Van Fleet has seen this blight proof one. I will be glad to tell him about them when I have an opportunity. Mr. Killen has one Japan walnut tree that is interesting. It must be 25 or 30 years old. I do not know where he got it. One limb we measured extends out 36 feet. The limbs on the other side of the tree are not quite so long but the tree is nearly 70 feet in diameter. Two years ago he sold the crop for $54.00, and he thinks he will get more this year. He has contracted the crop to a nurseryman. Mr. Killen has quite a number of seedling Persian walnuts and some of them, perhaps all, blight more or less. He is very much exercised over the blight. He worries more over this than he does over the chestnut blight.

Mr. Littlepage: Does the blight attack the nuts or the twigs?

Professor Close: Both but mostly it attacks the nuts. At Beltsville 4 miles north of College Park there is one of the best seedling walnuts I have run across. It fruits every year and sometimes a part of the crop is injured by blight.

Mr. Pomeroy: The husks turn black?

Professor Close: Yes.

Mr. Pomeroy: That is not blight; that is a fly injury.

Professor Close: Mr. Killen thinks that this year he partially controlled walnut blight with Bordeaux spray. One particular tree stands near where the spray tank was filled and one side of it was sprayed every time the spray rig passed it. The nuts from the sprayed side were really better than those from the other side.

Just below Dover, Delaware, at Woodside, I was at Mr. Sam Derby's place last Saturday and found something very valuable in the line of Persian walnuts, I think one of the best I have seen at all in the East. One particular tree was purchased for a Franquette but it is not. It probably is a Mayette seedling. Some of the men who tested the samples think this was one of the most desirable they had seen in the East. Mr. Derby bought about a dozen trees eight or nine years ago from some nurseryman. The trees are not alike in shape and size of nuts. They evidently are from the same bunch of seedlings but were sold for Franquette and Mayette. They are probably all Mayette seedlings.

Now, coming back to College Park, four years ago Mr. Littlepage was good enough to give me some pecan scions which I grafted into a seedling tree in a neighbor's chicken yard. The grafts practically all lived and last year, three years from the graft, about a dozen Major nuts were produced. These are probably the first Major pecans produced in Maryland. This year the Busseron and Major grafts bloomed but we had so many late frosts that the blossoms were killed and now there are only two Major nuts on the tree. My own trees are not old enough to bloom except one Mantura which bloomed this year but did not set fruit. I presume it was largely due to the late frosts.

In the fall of 1910 Professor Lake gave me some buds of Persian walnut and I put three buds into a young black walnut tree. During the following February we had a drop in temperature to 25 below zero, something almost unknown in this section of the country, but two of the buds lived through it. After growth started in the spring I cut one out and the other grew into a tree which produced three nuts in 1915. My area for nut trees is small so I am planting pecans, black and Persian walnuts, and hickory twenty feet apart with the idea of keeping them pruned. I have ten varieties of pecans and several of walnuts. Between these I have chinkapins and hazelnuts. There are eight or ten varieties of hazels and about sixty seedlings for grafting later on.

Mr. Littlepage: Did the young pecan trees bloom.

Professor Close: Only the Mantura and it must be about ten years old.

Mr. Littlepags: What kind of bloom?

Professor Close: Both kinds.

Dr. Morris: Which hazels are these?

Professor Close: They were undoubtedly European.

Dr. Morris: I think that is a very important point. Some time ago I said that our wild hazel drove the cows out of the pasture. It is a worthless weed with us in Connecticut and it is an important thing for us to transform our hazel pasture lands that are full of thickets of this weed over into good bearing propositions. I grafted a lot of hazelnut bushes with European scions. There are Chinese hazelnut trees that grow to be more than a hundred feet in height and six feet in trunk diameter. The Jacquemont goes to one hundred feet, and the Colurna frequently grows to fifty feet.. I believe it is going to be a very important matter to top work these large kinds of hazel trees which do not send runners out from the root and which are not inclined to send large suckers up from the stock. So the kind of stock upon which hazels are to be grafted is a very important matter for nurserymen. But we can also use the worthless pasture bushes profitably.

The President: In order that we may keep the business of our program up to the minute we should complete the naming of the Nominating Committee. In order to quickly bring it about and in order that all may have a voice in the matter I would suggest that five be nominated from the floor for the positions, that the nominations then close and that the Secretary cast the ballot for the members of the nominating committee.

The names suggested were: Mr. Olcott, Mr. Littlepage, Dr. Morris, Mr. Reed and Professor Close.

The nominations closed and the Secretary cast the ballot for the above named persons.

The President: We still have a few minutes and might take up the proposed changes in the constitution that were suggested at the Battle Creek meeting almost one year ago. I will request Mr. Bixby to state to you what the proposed changes are.

The Secretary: At the meeting at Battle Creek last November notice was given for proposed changes in the constitution, as follows:

At this meeting it was voted that Article IV, OFFICERS, be presented to the members at the next meeting for the purpose of voting on a change to read:

There shall be a President, a Vice-President, a Treasurer and a Secretary, who shall be elected at the annual meeting; an Executive Committee of six persons of which the President, the last two retiring Presidents, Vice-President, Treasurer and Secretary shall be members. There shall be a state Vice-President from each state, dependency or country represented in the membership of the Association who shall be appointed by the President.

Article VII. QUORUM, to be changed to read

Ten members shall constitute a quorum but must include two of the four elected officers.

By Laws:

Article III. MEMBERSHIP—All annual memberships shall begin either with the first day of the calendar quarter following the date of joining the Association, or with the first day of the calendar quarter preceding that date as may be arranged between the new member and the Treasurer.

The Secretary: I make a motion that the changes in the constitution as read be acted upon now.

Professor Close: I second the motion.

Mr. Foster: May I offer a suggestion in connection with the proposed change. It is relatively an immaterial one and I presume will be included. As a member here from the District of Columbia I think the District of Columbia should be included with the states.

The Secretary: I think that has been done. Grouped among the states appears the District of Columbia.

The Acting Secretary: That is, you would have the words "District of Columbia" inserted in connection with state, dependency or country?

The Secretary: I accept that.

The change in the constitution, as recommended, was carried.

Mr. Littlepage: As we have another minute or two there is one matter that we might dispose of. There was a committee appointed once upon a time on incorporation. It was thought by some of the members that if this association were incorporated, making it thereby a perpetual, tangible organization, it might be to its advantage. There might be some man who would be good enough to bequeath some funds to the Association for investigational work. As we are just a voluntary organization without any particular responsibility, it was thought by some that an incorporation would be desirable. I was appointed as a member of the corporative committee. The committee consisted of Mr. Webber of Ohio, and I do not recall the other member but Mr. Webber and I had several conferences. It seems to me that perhaps the best and most feasible way would be to incorporate under the laws of the District of Columbia. The code of the District of Columbia provides for incorporations of this kind for educational, scientific and benevolent purposes at a very nominal expense. For commercial corporations they must, of course, have a capital stock and ten per cent of it must be paid in in cash, but there is no such requirement under the code of the District of Columbia for scientific and benevolent corporations. There is a provision in the code for an incorporation of this kind by having the proper articles drawn up, setting forth the purpose of the organization, its line of work and its membership, naming for the time being three trustees, two of which at that particular time must be residents of the District of Columbia, and filing those articles with the Recorder of Deeds. It is approved and that becomes the charter.

The Association is then a body corporate with all of the rights and privileges of any other organization of that kind.

A great many organizations have been formed in the District of Columbia under that provision of the code. It seems to me about as simple and as comprehensive as any of the laws of any of the states, and about as free from any burdens or obligations of reports or matters of that kind. If it is the sense of this meeting, and I think you have quite a representative membership here, that this organization be so incorporated I shall take pleasure, after this meeting, in drafting proper papers, presenting them to some of the members for signature and perfecting a corporation.

THE PRESIDENT: That seems to be an excellent suggestion.

DR. MORRIS: I move that this recommendation be adopted.

MR. FOSTER: I second the motion.

The motion was carried.

The convention adjourned at 12 o'clock.

AFTERNOON EXCURSION OF THE NORTHERN NUT GROWERS' ASSOCIATION

October 7, 1920, 12:45

The members of the Northern Nut Growers' Association, in convention at Washington, D. C., October 7, 1920, made an excursion which included visits to the thirty-acre bearing northern pecan plantation of T. P. Littlepage; Dr. Walter Van Fleet's Government Station for the production of blight-resisting chestnuts and chickapins and other new hybrids, at Bell Experiment Plot, Glendale, Maryland; and the old Jefferson pecan trees at Marietta. The following notes were taken at points along the route:

Dr. Van Fleet: These are hybrids between the chinkapin and the Japan chestnut showing the blight even after thirteen years immunity. We do not do anything to check the disease at all.

There is a Japan variety said not to take it but you see how it affects it. It girdles it and the new wood builds it up. The tree is doomed. It is gone now but it has made a tremendous attempt to recovery. You see the new growth that has tried to come out there trying to bridge it and make it up. Of course even that is hopeful. In view of that we feel justified in breeding. The Chinese resist it much better. They take it more readily but they resist it far better. The efforts at self-bridging are quite successful.

This is one of the hybrids we have at Arlington. The parent tree got along for thirteen years without a sign of blight. By artificial inoculation we have given it the disease but it does not get it in the trunk. This is a Chinese chestnut seven years old and has had three crops. We took the most virulent virus and made a few inoculations and with absolutely no care the wound is closing up. The tree is apparently quite healthy. This is the Chinese Molissima, not of real good quality These are only seven years old and have already borne three very good crops. The nuts are somewhat larger than the wild native and ripen about six weeks earlier.

There are 1,100 trees here and I think about a hundred have been killed outright and probably 75 per cent of them show infections but there are a few individuals that do not seem to get it. It seems almost impossible to inoculate them. We are letting the disease run its way purely through elimination. It is only those that can stand it through a series of years that are supposed to be worth anything at all.

Probably no species is immune from it; I do not think we can use the word "immunity" in connection with it.

The party then visited the old Jefferson place at Marietta, and viewed the immense pecan trees which were given to Judge Duval by Thomas Jfferson. Thence to Mr. Littlepage's plantation.

Mr. Littlepage: These trees are set 100 by 120. The Butterick is a good grower. There is a great difference in the growth of the cultivated and the uncultivated ones. I would quit working about the first of August. The first of August here they are growing actively.

Question: Is that the habit of the pecan to set a crop and then drop off?

Mr. Littlepage: Yes, young trees will do that. This is a typical Busseron. They were all sprinkled with nuts; this tree had fifty nuts on this spring. There are some caterpillars on the Stuart. This is the work of the caterpillars on the Stuart. It set a number of nuts. This Greenriver is a little larger than the Major. It is one of the prettiest nuts, one of our medium sized northern pecans. The Greenriver grows in a forest in the Green River district in Kentucky. This is the first transplanted pecan tree this far north that has grown nuts.

Dr. Morris: In two or three years you will have a crop on them.

Mr. Littlepage: That is a Major, they grow like the Cedars of Lebanon. You don't see a winter-killed twig on a tree. They were full of nuts this spring.

Mr. Morris: That is so thrifty and so hardy that it might have some species of hickory in it.

Mr. Littlepage: The Stabler black walnut is much better than the Thomas. All black walnuts are reasonably easy to propagate. I have them all around over the farm; I stick pecans around the fences, or wherever I have a space. This chestnut is a European variety. It bears a big striped nut. It tastes a little better than the sweet potato.

Dr. Morris: It is good for cooking. It is the same as the Marron.

Mr. Littlepage: They are the Indiana hazels, and this is an European filbert.

EVENING SESSION

Thursday October 7 1920 8 p. m.

The convention was called to order by the President. Mr. Linton, at 8 o'clock.

The President: The presentation of the next speaker will be made by Mr. Littlepage.

Mr. Littlepage: I want to take just one or two minutes in introducing Mr. Reed, the next speaker on the program. The Department of Agriculture, as we all know, is an aggregation of many of the very brightest men in this country. Those of us who are here in Washington know that at times it is sadly in need of organization. It is perfectly apparent to anybody who has judgment enough to make observations that there is a great deal of very valuable material down there going to waste for the lack of organization. Perhaps it will always be so. I do not know. Institutions are not perfect because the individuals constituting these institutions are not perfect. The Department of Agriculture is, taken as a whole, a most wonderful institution. I do wish, however, that the Department officials would not always wait until they think they know exactly all the facts about a thing before they publish it. I sometimes wish they had enough nerve to say: "Now, this is what we found out today. We may change our minds tomorrow and if we do we will tell you so," the same as any other honest citizen. Why in the world they collect all the data they do, file it away day after day, month after month and year after year, and publish it after it is of no use to anyone on this earth, I never could figure out! I know it is a difficult problem because if the Department of Agriculture should say today that Winesap apples grow beautifully on Maryland hills some fellow would promptly capitalize that and go to selling the Maryland hills, the water underneath, the air above them and everything around them for the modest sum of ten times what it was worth. So that is the other side of it. It makes it necessary for the Department of Agriculture, of course, to be cautious. I know, however, that you all think as I do because you have said so to me but you do not all have the nerve to get up here and say as I do that the Department of Agriculture ought to give us more of these data; that they ought to give it to us for what it is worth today and in this lifetime, leaving it to us to have a little common sense to know that what they say must be taken as they say it. However, I did not get up here to say all of those things. My purpose is to introduce the speaker.

Now, I happen to know a great deal about Mr. Reed's work. I know that he is one of the most active men in the Department and one of the men who has, as much as anybody in the Department of Agriculture, the confidence of those of us who know about the project that he is working on. Mr. Reed has more work in the Department of Agriculture than he can do and I have been trying to lay out some additional work for him. For example, we have found in Southwestern Illinois a larger pecan than any propagated in the North. I saw it in a bunch of Schleys which is the premier pecan of the South. It was larger than many of the Schleys. We don't know anything more about the pecan but I would like to know about this and several others. That is one little job that comes under Mr. Reed's supervision and he ought to have more time and more help. As a matter of fact everybody in the Department thinks he should have more money for his particular project. Those of us who are interested in nut work think the nut people should have more money. The Department was very fortunate in receiving Mr. Reed who came from Michigan. I have talked to him many times and I have never found him yet to make a statement about anything in the nut world that he could not back up. In an illustrated lecture of this kind you have the good fortune to get a great many data that you cannot get in any other way. I wish the whole country that has an interest in these matters could hear it. If I could think of anything else good to say about Mr. Reed I would say it. He is entitled to it. (Applause.)

NUT CULTURE IN THE UNITED STATES.

C. A. Reed, Washington, D. C.,

We are annually importing into the United States from $30,000,000 to more than $52,000,000 worth of nuts. In this country, production is of leading importance with but three species,—the Persian (English) walnut, the pecan, and the almond. Of these together, we are producing in the neighborhood of $26,000,000 worth of nuts. In addition to these three species, two others now bid fair to become of considerable importance within the next decade. These are the filbert of the Northwest and the Eastern black walnut. In the Northwest, the filbert is receiving intensive attention at the hands of a considerable number of skilled horticulturists. The species is making rapid strides and in a short while will probably rank fourth in importance with reference to the extent to which it has been developed horticulturally. Possibly because of the extent to which it is common over the United States, the black walnut might properly now be rated as fourth as that nut has as great, if not a greater, range and is of interest to more people in this country than is any other one species of nut. It remains, however, to be seen how rapidly it will be developed by the pomologists.

The view before you is one which some of you have seen before. It was taken in the famous Vrooman orchard of Persian walnut trees at Santa Rosa, California. This is the largest and most noted orchard of Franquette variety in the country. It is from this orchard that scions have been obtained for the propagation of a great part of the Franquette orchards in this country.

In the Willamette Valley of Western Oregon, the walnut has received a large amount of attention during recent years; its development there has made rapid strides, and in the better soils, the trees grow rapidly and ordinarily bear very well. The photograph before you was taken in February, 1920, in an orchard near Hillsboro. It was situated on low but rich land and I regret to say that it was practically wiped out of existence by an unusual cold spell occurring from the 12th to the 15th of December in 1919. During that spell, the temperatures went down in some points of the Willamette Valley to 24 degrees below zero. As nearly as could be told at the time the picture was taken the trees were all killed to the snow-line which was from a foot and a half to two feet above ground. The owner has since reported that he cut the trees down to that line.

To some extent, the Persian walnut is grown in the eastern part of the United States. It was introduced here long before it was on the Atlantic Coast, but this side of the Rocky Mountains, it has nowhere become of great commercial importance. The photograph before you was taken in 1911. It shows a seedling orchard of twenty-three Persian walnut trees in Bucks County in the northwestern part of Pennsylvania. The orchard then appeared to be in first-class condition with no sign of winter-injury, but so far as we have been able to ascertain, the trees have never borne important crops of nuts.

This tree before us is the parent, or original tree of the Nebo variety from Southern Lancaster County, Pennsylvania, a variety first propagated by Messrs. Rush and Jones. It is one of the old historical trees of that section, and while the nut it produces is very good in many respects, for various reasons, the variety is no longer being propagated to great extent.

This is the parent Rush tree, another variety now not propagated as much as formerly, but one which, nevertheless, is a good sort and regarded as being well worthy of planting about the home grounds in sections of the eastern part of the country to which the species is adapted.

The Persian walnut is evidently quite at home from the eastern shore of Maryland up through Delaware and New Jersey to Long Island and lower Connecticut. From this strip west inland to well toward York and Harrisburg in Southern Pennsylvania, it is by no means uncommon. To some extent, it is grown in Western New York and close to Lake Erie in Northern Ohio. There are some trees in Eastern Michigan and a very few in what is known as the Niagara Peninsula of Ontario, but with few exceptions, the crops they bear are uncertain.

The tree before us is the parent of the Aurand variety named in honor of Mr. Geo. D. Aurand of Lewistown, Mifflin County, Pennsylvania. The gentleman in the foreground is Mr. Aurand in the act of examining a split in the bark caused by winter-injury. This trouble is fairly prevalent over a great part of the east.

Leaving the walnut industry for the time being, we will take a fleeting glance at the pecan industry. The greater part of our pecan crop comes from wild trees in the Southwest. The view before us is typical of Texas scenes especially in such towns as San Saba, Brownwood and others where nuts are brought from the country in wagon loads much the same as are cereals in the northern states. Pecan orchard development has taken place almost wholly in states east of the limits of the native range. In sections to which the pecan has been indigenous development has been very slow. The greatest and most extensive development of any section happens to be in Southwestern Georgia.

The view before us was taken in an orchard of Frotscher trees in Thomasville some 20 miles north of the Georgia-Florida state line. The trees were planted in 1905, set fifty feet apart, and last spring, because of crowding, the alternate trees were removed. The lower limbs had begun to die and the nuts from the lower branches had, for several years, been inferior in both size and filling quality.

The trees in the orchard before you were three years planted when photographed. This is an orchard in the Albany district of southwestern Georgia. It is in the immediate Albany district that more pecan planting has taken place than in any other one district of the whole South. It is possible to go from Albany in most any direction and to pass through orchards on both sides of the road with rows of pecan trees extending as far as the eye can see in each direction.

There is more or less of a prevailing idea that the pecan is a California product but it is the exception rather than the rule to find thrifty and productive trees in that state. The tree before you is one which bore enough nuts, during a recent year to bring $125 in the market, at 20 cents a pound.

Coming considerably nearer home, we find the parent tree of the Butterick variety situated on the Illinois side of the Wabash River a short distance below Vincennes, Indiana. The range of the pecan, as the most of you probably know, extends well up into Iowa along the bank of the Mississippi River and also into Central Illinois along the Illinois and other rivers and north to Terre Haute, Indiana, along the Wabash. The Butterick has been regarded as one of the most promising northern varieties. Reports which seem to be fairly well authenticated are to the effect that this fine tree has since partially died because of having its roots cut in the digging of a ditch.

Two years ago, Dr. J. B. Curtis (who is present in the audience) and myself spent a week's vacation in Eastern Maryland. At Easton we were greatly surprised to find what we agreed was the largest planted pecan tree we had ever seen. During the past summer, this tree has been photographed and its measurements taken. It has a girth measurement at breast height of 15 feet. Its spread is 129 by 138 feet. Its height was estimated at approximately 135 feet. It is not one of the largest pecan trees of the country as larger trees are not uncommon in many sections from Southern Indiana, south and west to Texas but they are native and not planted trees. We know this to be a planted tree as there are no native pecans in the state of Maryland. This tree bears with a fair degree of regularity. We are told that in 1917 it yielded approximately twelve bushels of nuts which, although small, were exceedingly good and a delight to the children of the whole neighborhood.

Taking up the almond industry, the view before you is of interest because of historical reasons rather than otherwise. It is one of the few remaining large orchards planted by the late Mr. A. T. Hatch known as father of the principal varieties of California today. Mr. Hatch planted several hundred acres of almonds in the vicinity of Suisun about midway between Sacramento and San Francisco but cold winds from San Francisco Bay prevent almond trees in that section from being commercially productive, and as result, the section has been abandoned as an almond center. Nevertheless, this picture is of interest because it was in these very orchards that were originatel the famous Hatch varieties, the Ne Plus Ultra, Nonpareil, I. X. L. and the Drake. A great part of this orchard has since been top-worked with prunes.

Almond orchards in bloom afford some of California's most beautiful sights during February. The two trees in the foreground are typical specimens of I. X. L. while in full bloom. The almond begins bearing at about the same age as does the peach; at 5 or 6 years from the time the trees are planted, they begin to pay a little more than the cost of up-keep, and at 8 years, they are regarded as being in full bearing.

This scene was taken in one of the oldest orchards in the state of California. The trees were planted in about 1870. The picture affords a typical illustration of one of the methods of harvesting. The nuts are being thrashed or "knocked" from the trees to heavy canvas sheets spread upon the ground which are drawn from tree to tree by horse power. The nuts are loaded loose in wagons or in sacks and taken to some central plant where they are run through hulling machines and the nuts separated from the hulls after which they are spread out in trays and left in the sun to dry. At that season of the year, there is practically no danger of dew or rain and, after being exposed for several days and nights during which they are frequently stirred, they are taken to the nearest exchange point, bleached and put forth into final shape for the market.

A very important factor in the success of almond production is the honey-bee. Bee keepers shift their hives from orchard to orchard during the blossoming period making a profit out of the honey and at the same time charging a rental to the orchard owners. The bees, of course, attend to the matter of interpollination.

In some sections, it is necessary to equip the orchards with smudge or fire pots which are kept filled with crude oil and fired at the moment the temperature goes down to below the freezing point during the blossoming period. In one district these pots were this last year fired again and again but after all the temperature went down to a point such that a great part of the crop was lost. We are told that it is possible to raise the temperature 26 to 34 degrees. It is tedious work and a dirty job. The oil is placed in the pots in the daytime and the firing usually takes place in the latter part of the night, very often after 5 o'clock in the morning.

We come now to the filbert industry. One of the reasons why filberts were planted in the northwest was because the native hazels grow there with great vigor. This picture shows a typical stool of the native hazel as it is commonly seen in the western parts of Oregon and Washington. Not infrequently it attains a height of 30 or 35 feet and when trained to single stems, the trees not infrequently develop trunk diameters of from 6 to 8 inches.

The Mr. Vollertsen of the Northwest is Mr. A. A. Quarnberg of Vancouver, Washington. In 1893 Mr. Quarnberg read an article by the late Professor H. E. Van Deman in which the latter urged the experimental planting of the filbert in the Northwest. Mr. Quarnberg ordered two trees of the Du Chilly variety from Mr. Felix Gillett, a Frenchman and then proprietor of the Barren Hill Nurseries, Nevada City, California. These were planted in February of 1894 and are believed to have been the first trees of that variety shipped to the Northwest. They are so close together that they are considerably crowded but still they have done fairly well, bearing in some years as much as 45 pounds together.

This is a view of the first filbert orchard planted in the Northwest. It consists of three hundred trees mainly of the Barcelona and Du Chilly varieties obtained from Mr. Gillett in January of 1901 by Mr. Quarnberg and planted by him for a neighbor, Mr. John E. Norelius.

In this connection, it is interesting to note that the Barcelona variety had already become fairly well established in the Northwest when Mr. Quarnberg first introduced the Du Chilly to that section. The picture before you is of one of the oldest Barcelona trees that has come to my personal attention. It shows a tree in Portland measuring 45 inches in circumference one foot above ground. It is perhaps the largest filbert tree in thte United States. When visited during the past September, the limbs were bending down with nuts and an estimate was made that it would have from 50 to 70 pounds of mature nuts.

The tree before us was another Barcelona of good size. In 1919 it matured a crop of 45 pounds of nuts. However, unfortunately it was caught by the cold spell already referred to and the tree about half killed. It stands in a low place in an orchard of some fifty trees and was one of the most seriously affected.

Returning to the East, we have before us a picture of an Italian Red filbert tree in the orchard of Messrs. Vollertsen and McGlennon north of Rochester, New York. It is a young tree not over two years old. Each terminal has a cluster of nuts. Mr. Vollertsen is observing it closely and thus far regards it favorably.

Mr. J. G. Rush of West Willow, Pennsylvania has brought out a native hazel which offers considerable promise to nut planters. It is a remarkably prolific variety and the nuts are both large and thin-shelled. This picture illustrates something of its heavy bearing tendency.

We come now to the black walnut. One of the first varieties propagated was the Thomas. This picture is one of several hundred grafted trees of that variety owned by Mr. E. A. Riehl of Godfrey, Illinois. As here shown, they are very prolific and these hundred trees grown mainly on hillsides and untillable lands are furnishing Mr. Riehl with a very fair income. On the whole, the Thomas is a good variety. It cracks much better than does the average black walnut but still there are some others which are a shade better in the matter of cracking quality. The picture before you shows the parent tree of the variety first known as Rush but later changed to Herman in order to avoid confusion of names with the Rush Persian walnut. This variety has been propagated to some extent but according to recent accounts, the parent tree has been cut down. The tree now before you is the parent of a well known variety, the Stabler. It is situated in Montgomery County, Maryland, some 20 miles from the city of Washington. Reports have it that this tree bore 30 bushels of nuts in one mythical year, but the present owner states that the maximum yield of any year since he has known the tree has been 10 or 11 bushels of hulled nuts. The variety is being propagated by several nurserymen and trees are available for planting.

Another variety now being propagated by the nurserymen is the Ohio, the parent tree of which is some 20 or 30 miles out of Toledo in the state after which it was named. This picture ,showing seven nuts) illustrates a remarkable tendency on the part of young grafted trees to bear at an early age. This tree in the nursery of Mr. Jones of Lancaster, Pa., was grafted in May and photographed in September one year following. Of course early bearing is not wholly desirable but in a way it will refute the common belief that black walnuts are necessarily tardy in coming into bearing.

Col. J. C. Cooper, McMinnville, Oregon, President of the Western Walnut Growers Association has on his home grounds two black walnut trees grown from nuts obtained in the East which were 6 years old when this picture was taken. Each of these trees which you will notice are from 20 to 30 feet high bore approximately a peck of nuts during the year when photographed.

The native butternut is a species which has been quite neglected by our horticulturists but through the efforts of Mr. Bixby, a few varieties have been brought out and are now being propagated by the nurserymen. In spite of its thick shell, the flavor of the butternut is preferred by many people to that of any other nut on the market. It is our most hardy species of nut tree. It grows as far north as Maine and Nova Scotia. Two or three recognized varieties are being propagated. Probably those which will soonest be available for dissemination to the public are the Aiken from New Hampshire and the Deming from Connecticut.

One of our most decorative native trees is the American beech. As fine a specimen as is often seen is this one not far from Easton, Maryland photographed during the past summer. It is an enormous tree and very productive. It is one of forty or fifty trees on the grounds of one of the numerous large estates of Eastern Maryland and was planted, so we are told, in 1830. The lady giving this information said that her mother had the trees dug up in the forest by slaves and hauled to their present location in ox carts. Now, ninety years later, they form a magnificent avenue of trees. Fine crops of nuts are borne each year. The nuts are small and most too tedious to extract from the shell to be useful for human consumption, but they go a long way in the finishing off of the turkeys and other poultry in the fall.

Another species of nut which is quite neglected is the Japanese walnut. It has been on trial in this country for perhaps fifty or seventy-five years. It has indicated its adaptability to a wide range of the country; it succeeds on a great variety of soils and it is both hardy and early to come into bearing. It has this disadvantage, however,—the nuts are small; but in flavor the kernels can hardly be distinguished from those of the butternut. Very often it forms a most attractive tree and it should be used to a much greater extent than it is on home lawns.

In Michigan, hickory and black walnut trees have been used along the highways as avenue trees for a considerable period. In Pennsylvania occasionally the Persian walnut is used as an avenue tree. One of the beauty spots along the roadway of Lancaster County is this stretch of roadway under the spreading branches of Persian walnut trees. Senator McNary of Oregon thought so well of the beauty of the filbert that he induced his brother to plant several trees on his lawn in the city of Salem. It is no exageration to say that there are no prettier trees in the city then are these before you.

To a considerable extent, nut raising is being combined with the poultry industry in the Northwest. The poultry raisers claim that some kind of trees are essential to furnish shade in the poultry yards. They say that fruit trees are not desirable for the reason that at harvest time the chickens not only pick and ruin the fruit but themselves get internal disorders. Nut trees, they argue, fit in very well, as the chickens cannot hurt the nuts nor the nuts the chickens. Furthermore, the trees in chicken parks salvage a great deal from the chicken manure which would otherwise be lost. The use of nut trees in this way is a practice which it would seem could well be introduced to good advantage in the eastern states.

Among the ornamentals, it is difficult to imagine a species which could more effectively be used than the pecan. The picture before you was taken of a comparatively young tree perhaps 30 or 40 years old on the home grounds of a private citizen near Easton, Maryland at practically our own latitude. It is a most beautiful tree.

Rightly used, the black walnut is also one of our most effective species in the landscape. The picture before you is of a tree 51 years old. It stands in front of the home residence of a sister to United States Senator Charles L. McNary of Salem, Oregon. When photographed, this tree measured 10 feet, 6 inches in girth at breast height. It would be hard to imagine a more noble and graceful nut.

Along the roadways of California, we not uncommonly find the native black walnut used as an avenue tree. It is very refreshing and cooling on a hot day to drive under trees of the sort illustrated in the picture before you. This avenue of trees is along the Lincoln Highway less than a mile west of the University grounds at Davis.

THE PRESIDENT: The next speaker on the program will be presented by Dr. Morris.

DR. MORRIS: They say that a biographer unconsciously writes his autobiography. That is not tautology. Some one writing of the late Frank N. Mayer said: "The plant hunter and explorer is the unsung Columbus of horticulture." Our next speaker was the one who wrote that in Mr. Meyer's biography. We all recognize it as autobiography. Emerson tells us that every successful institution is the lengthened shadow of one man. There were heroes before Agamemnon and botanists before Dr. Fairchild, but with the beginning of the new century there came into existence the development of a new idea, that of exploration in foreign countries for the purpose of bringing to us their valuable plant products. It was one of those things which we may say makes the whole world kin because the economists tell us that basically the food supply is fundamental to all subsequent human activities. Dr. Fairchild organized the machinery of exploration for purposes of introduction into this country of valuable plants from foreign lands. There is perhaps at the present time no one who serves better as peace maker than does the one who gives the world more food. From the economist's standpoint the food supply subtends all advances in civilization. Now the hour is late and we all know what Dr. Fairchild has done. Any remarke on my part are made because they belongs to the form of polite procedure rather than because of need for telling of things which Dr. Fairchild has accomplished.

Dr. Fairchild: Ladies and Gentlemen of the Northern Nut Growers Association. When I face men and women who are doing things in agriculture I feel a peculiar degree of embarrassment. I do not know why but I suppose it is because what I have done, what little I have done in bringing in these new things, has never enabled me to get to the bottom of any of the things that I have brought in. In other words I feel that I am in the presence of a number of men who know down to the very smallest minutiae the business that they are engaged in. Now I do not know these minutiae about plants. I wish I did. There is nothing more fascinating in the world than to take one crop and learn to know it "down to the ground." It is coming to be one of the greatest things in the imagination of man, this grappling with the fundamental problems of agriculture which are wrapped up in the varieties of the plants that we grow. I have had a very severe education in that matter of varieties and I want to congratulate you as a body of men and women who are individually going to find out what these best varieties are.

I suppose that the talk that Mr. Reed and I had in a bamboo grove out in Chico, California, when we were trying to find out uses for the bamboo and Reed said: "Well, the pecan and almond growers want to knock the nuts off their trees with these bamboo poles," is what led up to this talk, and I want to thank Mr. Reed for the opportunity to show slides of a few of the new plants which we are working on in the Department of Agriculture.

We brought in so many of them, (47,000 different kinds) in these 22 years that the office of Plant Introduction has been in operation that Mr. Reed suggested that the nut growers would like to have thrown on the screen pictures of the nuts of foreign countries. I said that we did not have any. Then I began to dig into our own literature, project reports, experimenters cards, correspondence and the other recording machinery that we have and I found that we had a good many. I want to make it perfectly plain to you that what I am going to do tonight is simply to open a door and show you the possibilities of some of these foreign nuts. There are a great many more that we have not succeeded in landing on the shores of America, and if any one of you will come to my office on 13th and F streets I will throw all the correspondence and photographs on the table and let you look through it.

It has been said that the Department's work is badly organized. Yes, it is badly organized. But I do not know how you are going to very well organize with a small body of men a group of projects every one of which is a life job for a man, especially when you cannot get the men, and when you do get them they do not stay on the job for life. So there is the great difficulty. Mr. Littlepage has hit the nail on the head. The Department of Agriculture is not well organized but it is not an easy thing to organize experimental work on at least 150 different kinds of industries with the money and the men we have. The fact that the investigations require the men to be on the land close to their work and that we are all in city buildings, is a great handicap. We have scarcely a tree or shrub or plant of any kind that bears on our work within two or three miles of the Department of Agriculture building. We need the land. We need a great many more men, and we need more money.

I landed in Greece in 1901. In Athens I saw them selling on the streets these pistache nuts which I opened with my fingers. The kernels are a brilliant green. I had never seem them before. I had heard of them. They were sold around the streets by the Greek peddlers and called pistachios. The pistache or pistachio industry is one which I wish some young, energetic man of seventy would take up. I say 70 because it requires a young man of seventy to take up one of these nut industries, the boys of 26 are too old. Some young fellow of seventy should go into the pistache industry and find out what there is in it and develop it into a great industry. The American Consul in Palestine told me six or eight years ago that there was no plant culture in all Palestine that paid so well as a pistache orchard. Trees have been known to yield as much as 40 to 50 dollars apiece. The Grecian pistaches are different from those of Tunis and Algeria and others of the Mediterranean countries. There are a good many different varieties.

This picture shows a piece of praline made of pistaches. This is sold on the streets of Athens and compares very favorably with our pralines made in New Orleans from the kernel of the pecan.

Mr. Chisholm, who was connected with the Consulate in Athens and who spoke Greek very well, took me out and showed me what these pistache trees looked like and when I found this miscellaneous lot of grafted pistache trees I made an arrangement to purchase the whole collection and send it to this country. I had great difficulty in getting the American Consul in Piraeus to help me ship them. I could not wait indefinitely and it took a good while to have them dug and packed. I asked him if he would send them and he said he was very busy. I told him this was a matter which concerned the people of the United States and if he did not have time to do it I would telegraph to the Secretary of Agriculture and tell him that the Consul in Athens was too busy to ship these plants. Finally he consented to ship them and this was the first shipment of grafted pistache trees to arrive in America. They were badly grafted, badly packed and badly prepared and I think only one of this whole collection survived and is now growing in the Gallespie grounds at Montecito, California.

Mr. Kearney ought to be here tonight and Mr. Swingle and Dr. Rixford. These three men have given more attention to the pistache than I have. Mr. Kearney was studying the date palm industry of Southern Tunis and in connection with it he made a study of the pistache industry of the desert region of the coast of Tunis. This picture represents an Arab standing beside an old pistache tree that probably is forty or fifty years of age. It represents the pistache in its winter dress. They are deciduous trees. They plant one male tree to about twenty females. We have had a great real of difficulty in propagating these pistache trees. We have five different species of stock on which to grow them, and we ought to learn all the best varieties in the world. But unfortunately some of the best varieties in Sicily are infested with a moth which lays its eggs in the twigs just below the leaf scar and it is impossible for the entomologist to detect these eggs without destroying the buds. That apparently trivial circumstance has made it impossible for us to get these cuttings in from Sicily without sending a trained horticulturist there for them. We never have had the money to send a man there who could do it, a man who had had the necessary experience. As a consequence we have not as big a collection of these pistache varieties as we ought to have.

These men in the photograph are getting the scions for Mr. Kearney, and I am glad to say that these particular scions which they cut are now growing in California. Mr. Kearney also on this same trip visited the Duke de Bronte estate on the slopes of Mount Etna. It was an estate bequeathed by the King of Italy to Lord Nelson, who was made the Duke de Bronte and it is still the property of the Nelson family. Mr. Beck, who was the manager for this estate and with whom we have had correspondence for nearly 18 years, gave us perhaps more information than we have gotten from any other foreign source on the cultivation of the pistache. The Trabonella, which was one of the best commercial varieties, came from the Bronte estate on the slopes of Mount Etna, where pistache growing is a paying industry. In Europe the nuts are very largely used, outside of the Mediterranean region for making the pistache ice cream because of the green color in the seed itself, and in the Mediterranean region both the yellow and green varieties as we are coming to use them in this country, as table nuts. The highest price is paid for the green pistache nuts which are used in ice creams and confectioneries. Here are two Sicilian horticulturists, one of them holding a bundle of bud sticks. This Trabonella variety is now growing in America. We have collected pistache nuts from many parts of the world. A very interesting man by the name of Jewett who became acquainted with the late Ameer of Afghanistan procured for us the Afghanistan pistache. I got in correspondence with him through the Consul in Calcutta. Through a mistake made in sending some of this correspondence direct instead of to Calcutta it nearly cost him his life. I did not know the conditions there and asked Jewett in my letter what the possibilities were of sending an Agricultural explorer there. The letter fell into the hands of the Ameer and aroused his suspicions. Jewett was one of the two English speaking persons at that time in the country. One Sunday morning my door bell rang, and Jewett came to my house in Connecticut Avenue with two big saddle bags filled with seed sent by the Ameer. This collection of pisache seeds with its Afghanistan label composed part of the collection of seeds. Very few of the seeds grew however and the seedlings, which like many nut trees do not come true to seed, have not produced any varieties of particular value.

A year ago I had the pleasure of making a motor tour through California. I went to see Leonard Coats, one of those real pioneers of 65 or 70 years of age, who has perhaps done as much for California horticulture as any other one nurseryman, and he took me up into his orchard on the hill side overlooking his nursery where no drops of rain had fallen between the months of March and October when I was there and where they only have 22 inches of rainfall anyway, and I found growing there this collection of pistache trees which we had sent him about ten years ago. The nuts are borne towards the ends of the branches. The tree is able to withstand any amount of drought and as I sat there and he told me how prohibition had wiped out the vineyards of the surrounding country, how the Italians had deserted them and gone back to Italy, I could not help feeling that in this beginning on his hillsides we had the possibility of covering those thousands of acres of hillsides which exist in California today, from which the grape vines have been taken out, with a nut crop of the very first importance. These little beginnings are really the most interesting things in life. I read in the paper today that this is the ninety-fourth anniversary of the first railroad in America and my mind went back to a conversation I had with Edward Everett Hale when he told me that his father was the first man to bring over an English locomotive to America. What do you suppose was the principal objection that the people had to railway exploitation in this country? They could not see how two trains could pass each other on the same track. So his father brought over from England a little model switch and put it down in his parlor and took people in there and showed them that two trains could pass if one ran off on a siding. That story of Edward Everett Hale has helped me to understand why it is that most people hesitate to go ahead into any new industry always seeing some impossibility in its development. I could probably prove to you beyond a shadow of a doubt that not a single one of these nut trees I am showing you tonight could ever be made a success. Notwithstanding that they are successful.

This is one of the Sfax varieties from Tunis growing in our plant introduction gardens at Chico. We had to establish gardens where we could grow these trees and send out the young plants to growers and in these gardens we have test nurseries or test orchards as we call them where we grow these fruits. This is an Assyrian variety brought in by old Dr. Fuller who spent some time as a missionary in Asia Minor and became convinced of the importance of the pistache industry, and has been one of the pioneers in these small beginnings. This is a six years old tree. This is 15 years old a seedling tree near Fresno. It has borne a good many crops of fair sized pistache nuts as large as the Trabonella, the Sfax, the Tunis and the Alleppo and those forms which are going to be the real pistaches of the future in this country. The pistache in fruit is a most interesting sight. The nuts are pinkish. They have the pinkness of the peach, almost, without the fuz and they are covered with a thin skin which is taken off usually with the fingers. The nut inside has a texture that makes it very attractive. When they are first gathered it is very difficult to crack them with the fingers but if they are put in the oven and roasted they open up and leave a little suture into which you put your thumb nails and pry the ends open.

This picture gives you some idea of the yield of the pistache. It is a fair yielder, as much as fifty pounds of nuts having been borne by eight or nine year old trees. Ours have not done as well as that. The price of course ranges like the price of all other nuts. They sold last year for 75 cents a pound here in Washington. The kernels sell for $1.50.

This gives you a good idea of the pistache fruit with its outer shell. the nut and the green interior. If any of you are going to California and do not like the idea of taking up hazel nuts, walnuts and pecans, if you will take up this industry we will help you all we can. It will grow in Arizona, New Mexico, and we have records of them growing in Arkansas. They will stand a temperature below zero. Trees have been known to live through several winters even in Southern Kansas.

In all these investigations we have found the stock problem is very important. Here we have the *Pistachia atlantica* which has much smaller seeds. It is this that we are using most commonly as a stock for the pistaches that are being grown in California. Frank N. Meyer brought back from China the seeds of the Chinese pistache, the hardiest of all pistaches, a tree which has been almost hardy even as far north as Washington and central Kansas. It is not only a nut tree but a magnificent ornamental tree and grows to a very large size. We have used it as an avenue tree leading to our plant introduction gardens in Chico because it colors up so beautifully in the autumn and the spring. In the spring the tips of these leaves and branches are a brilliant pink and in the autumn it turns a gorgeous scarlet. It is destined to be one of the best landscape trees of California in our opinion. It grows to be centuries old.

Frank Meyer standing beside a tree which has stood three centuries at least. Imagine what pleasure he would have had had he only lived to walk under this great avenue in his old age.

The question of congeniality between the true pistache and the Chinese pistache is shown here. We rather jumped to the conclusion, when we found that the ordinary pistache overgrew the Chinese pistache, that perhaps it was not so good a stock as we first thought, but I notice, looking back at my photograph taken in Greece in 1901, that the regular stocks used by the Greeks for the pistache are overgrown in the same way by the true pistache. We have much larger trees than these now in Chico and as the Chinese pistaches are very old and large trees we have come to the conclusion that in all probability the pistache will be successful on this Chinese stock.

I was walking through a market in Hong Kong in 1902 and I saw a few bushels of nuts that I had never heard of or seen before. The nuts looked like acorns but when I picked them up I found them as hard as hickory nuts. I cracked one of them with a brick and it was almost as hard to crack as a hickory nut. It was unmistakably an acorn, I thought, and I bought a bushel of the nuts and sent them to this country. It is called Pisania by botanists and it has many of the characteristics of an acorn. The kernel of this nut comes out whole and for that reason it would be very easily cracked by mechanical means. It has a sweetness which does not suggest an acorn. It does not remind you of the acorn. It is a commercial product in Southern China shipped down the West river and it seemed to me well worth while trying to grow it in the United States. We have had a great deal of trouble with it. We did not find the right place for it at first. It was hardy here in Washington, even, for a few seasons but the temperature at seventeen, eighteen and twenty below zero finally killed it out. It is now growing down in Mississippi.

Here is a photograph sent me from Honkong, the only one I have of the tree as it appears on the hills of Honkong. This tree which is now 11 feet tall on the place of Mr. Joe Williams at Langdon, Mississippi, is one of the few that is now growing in the United States. There is one in Southern California. It probably would be perfectly hardy along the Gulf coast. Just how good a bearer it is going to prove I do not know but it is very interesting even to register the fact that the plant is established in the Southern States.

The *Macadamia ternifolia*, or Queensland nut, is not quite so well known in Queensland as I thought it was. A very brilliant young man from Australia, by the name of Johnston, passed through my office the other day and I showed him the photograph of the Macadamia and to my chagrin he did not know much about it, although he was a very good botanist and a very keen man. He said "We do not pay much attention to these things over there." That is really characteristic of many of the foreign plants that we have brought in. They are not developed in their own countries any more than some of the fruits which we have in this country are not developed by us. Mr. Littlepage and I are going out in a day or two to see if we can find some larger papaws. Now the papaw has been just as badly neglected by the Americans as the Macadamia by the Australians and it may be that the only way to get the papaw developed is to send it to some other country and get them to develop it. We do not always develop our own possibilities.

This is a tree grown in Avon Park, Florida. It interests me very much because it looks as if it would be a good bearer, is suited to the sandy lands of southern and central Florida, seems to be quite hardy and is a beautiful nut. It will vie with any other edible nut that I know of. This tree is in the Royal Palm Gardens in Palm Beach. The trees were brought in by us about 1905 or 1906.

This is a tree in Cuba where it is perfectly at home.

This gives you an idea of the character of the nut in a bunch. This is the nut. The shells when opened are as attractive as anything I know of. This is a very thick walled variety. We have much thinner walled forms that have come from Hawaii where it is now being grown. The dark part is a maroon brown and the lighter part is a brilliant creamy yellow. Altogether it is an extremely attractive nut, an excellent eating nut and has very good food qualities. We have had them analyzed, and all the data are at the disposal of you gentlemen at any time you wish to consult our files.

One of the first pieces of foreign work I was asked to do for the government was to get and import the hard-shelled almonds of Spain. Most of you have eaten the Jordan almond and I imagine most of you think it comes from California, but there are very few Jordans grown in California and, so far as the investigations go which I have been able to make in California in co-operation with the candy manufacturers, I have discovered that the California growers are not growing the best almond in the world. That the IXL and the Nonpareil and other almonds are not considered sufficiently good for such men as Lowney to use in the manufacture of their almond candies was a surprise to me. And the reason? In the first place the skin of the kernel itself is too thick, the nut is too brittle and it has not the flavor of the imported nut. I was shocked the other day to read from cover to cover a bulletin on the subject of Almonds, and to find that not one word was said of flavor. It had to be a good cracker; but the marketable qualities did not take into consideration the question of the *flavor of the kernel, its hardness or the thickness of skin.*

This picture on the screen was taken in southeastern Spain. These are the almond crackers of Spain and a poorer lot of people I have never visited in my life. The little children, not over four years old, instead of playing as ours play, carry around with them in their hands little bundles of wheat straw which they braid with their hands as they play, making sombreros which are shipped to the Argentine. It is a very poor country where these grow. The soil is very thin and very dry and these almond trees grow on the hillsides. It was with an unpleasant feeling that I took these cuttings from southeastern Spain, and brought them to America. I got them from the trees that were bearing these almonds, they were budded in California and we know where the trees are growing in California from these buds.

This is a view in one of these hillside plantations of southeastern Spain with two of the almond growers.

This is a view in the plains region near Valencia showing both the hard shelled almonds and the soft shelled ones. The soft shelled are those which are easily cracked with the fingers while the hard shelled have to be broken with a hammer or an instrument. It is these hard shelled almonds that we have been interested in getting.

I have not kept in touch with this almond situation as I would have if I had been a specialist on almonds instead of spreading my energies out over the whole field and it is time someone really got into the almond business. I once traveled fifty miles from Bobadilla, Spain to the next railway station between solid walls of seedling almonds in bloom. No American has ever been to these seedling orchards to see what they are. It should be possible to find in those rows that are now 25 years old late flowering varieties which would be adapted to the conditions in California or early flowering varieties which would cross pollinate the Jordan almond. But we have not had the extra man with which to do this and carry out the other things we have been obliged to do. The interesting thing about this Jordan almond is that it behaves differently in our country than it does over in Spain. You notice how smooth each one of these almonds is. There is no sharp keel on the Spanish grown Jordan almond at all. It is smooth all around. Here are the almonds grown in California from the scions which I brought in. You see how these "keels" are developed and the nut has also become more pointed. We have not had an opportunity to investigate this thing thoroughly, but I am convinced that this is an environmental effect. Dr. W. A. Taylor has suggested that the fact that the Jordan flowers before any other variety comes out may mean that the California nuts are the result of self fertilization and this self fertilization may be the cause of their different shape and texture. Either that or the bud wood which I brought over from Spain was not representative of the Jordan variety although I picked it from trees that were bearing these nuts and I saw the nuts and they were typical. Of course it is possible that on the bud stocks which I brought over there was this hereditary tendency to produce these keels. However, we have made importations of the Jordan almond since then with the same result. One of these was grown in California in the desert region and one in Niles where John Rock, the great pioneer horticulturist of California, had his orchards. Both of them behaved in the same way. I sent some of the best kernels from these imported Jordan almonds to Mr. Lowney, the candy manufacturer who imports large quantities of Jordan almonds from Spain, and he reported that he could not use them for his candy manufacture because they were too hard and the skin too tough.

One of the most interesting experiences of my life was in 1903 when I visited a French barber in a little town called Nevada City, California, in the foothills of the Sierras. He had come over to this country without a penny and had set up a barber shop in this little mining village of Nevada City. He had saved from his fees for cutting people's hair an shaving them, $3,000. He had bought a piece of barren hillside which everybody laughed at him for buying; and he sent an order for $2,500 worth of nut trees and fruit trees to a nursery firm in his old home in France. He did this without even having an irrigating system with which to irrigate those plants when they arrived. He told me with tears in his eyes how he had worked night and day, carrying buckets of water to save this collection of plants when it arrived from France. When I visited Felix Gillett in his plantation there, which he called the *Barren Hill Nursery,* I felt that I had never seen a more delightful spot in my life. It was a kind of a paradise which he had built up by his love for plants and his wonderful knowledge of the varieties which he handled. He certainly was one of the great experts of this country in the nut and fruit industry, particularly the nut industry. It is his collection of hazelnuts which Mr. Reed spoke of as having found its way into Mr. Quarnburg's hands. In fact I was at Mr. Quarnburg's place a year ago last summer and learned that he got his first start from this little French barber in the mountains of Nevada.

This is Felix Gillett standing beside the first Jordan almond tree in America. The difficulty with the Jordan tree in this section was that it flowered too early and too few crops were produced. We have tried a good many sections for the almond and one of the problems, in my opinion, is the development of stocks for it. Here is the IXL on one of Meyer's Chinese stocks *(Amygdalus davidiana)*. It does very well on this stock in the region of San Antonio, Texas. But the future of this almond business ought to have been told you by Meyer after he came back from his trip in Western China. These bushes are of the Tangutian almond, a little bush almond, growing occasionally 15 or 18 or 20 feet in height and hardy. It was Meyer's plan, had he lived, to find some place in Southwest Colorado in which to breed hardy almonds that would cover those hillsides with a food producing plant. I believe had he lived he would have done that for we have gotten together already for the breeders a number of forms of great promise. Mr. Wight of the Office of Pomological Investigations is now in California doing breeding work, and I hope his life will be spared so that he can produce a practical bush almond. My object in throwing this photograph on the screen is to show you a hillside covered with a food producing plant which has never yet received the attention of human beings, and yet if studied might lead to the production of an entirely new type of almond which will probably grow as far north as the Dakotas.

Jumping from the Dakotas to Florida I want to introduce to you the Candle Nut or Kukui nut of the Hawaiian Islands which is growing in the sandy regions of the tropical belt of Florida. If you will read the literature you will find that it is referred to as a cathartic, resembling in this respect the castor bean. The problem is whether the candle nut as grown in Florida is poisonous or not. Prof. Simpson is growing in his yard in Florida a tree of this Kukui nut and has eaten these nuts for years, and he just sent me a couple quarts of them from his tree and I have tried them on my friends with no injurious results whatever. The thing to look out for is this fetish, this superstition of poison. This is a very hard-shelled nut, very oily and resembles somewhat the Brazil nut. If a market can be made for it, and there does not seem to be any reason why there cannot, there is no reason that they cannot be grown and they will be grown in southern Florida. That country which in 1898 was a wilderness is now developing very rapidly as a region of homes and what they want is plants that they can grow down there that they can live upon.

On the left is one of these trees which has a good many nuts on it.

It is in Miami, Florida. This is a branch of one of these Kukui nuts in Miami.

This is probably the least known of any of the nuts. It is the Yeheb nut. It belongs to the order of Leguminosae and they tell us it is so sweet, having between 21 and 22 per cent of sugar, that the native Arab will desert his dates and rich diet, which is the ordinary diet of that region, and take to the Yeheb whenever it comes into fruit. This Yeheb shrub grows in the deserts of Italian Somaliland and ought to succeed in our southwestern country. During the war there was attached to the Italian Embassy the Italian Explorer Captain Vanutelli, who had the distinction of having been captured by a savage chief in Abyssinia and bound for over two months to a black Abyssinian slave. When I spoke to him about this Yeheb nut he said, "Yes, I have eaten it. It is a wonderful nut. Some day I will get you some of it." When the shipment came there were two tons of nuts and I was a little surprised to say the least. They were brought on camel back over the deserts. During the war they took eight or nine months to get to Washington and when they arrived they were all dead. Notwithstanding many attempts this nut is not grown in the United States but we will have it. It is very thin-shelled, the kernels come out whole and have a very sweet, delicate flavor.

You have just come from Dr. Van Fleet's chestnuts. You know that this is the Chinese chestnut *(Castanea mollissima)* which Meyer found in China. Dr. Van Fleet would probably tell you this is not the way to prune them if you want to increase the chances of these Chinese chestnuts withstanding the bark disease. You are probably familiar with the fact that Meyer discovered over in China on this species the original chestnut bark disease which has destroyed our chestnuts in this country. He found that this variety was highly resistant but not entirely immune to the disease. Dr. Galloway, who is handling the propagation and distribution of these Chinese chestnuts, for our office, wishes to have it understood that in the distribution of these which we will make in the spring we desire to have them sent out in blocks; we would rather not distribute these Chinese chestnuts in single specimens but would be very glad to consider offers from people who have a quarter or a half of an acre that they want to plant. We want to get some idea of the behavior of this species as an orchard crop.

This illustrates the way, as I understand it, that Dr. Van Fleet thinks the trees should be treated, on the left; the way they should not be treated on the right. They seem to be much more susceptible to the disease when pruned up in this neat orchard fashion.

One of Meyer's photographs taken at Fanshan, northeast of Pekin, where he found the chestnut bark disease. This is the way the trees appeared. This gives you some idea of the size of Chinese chestnuts which he got. Those back on the hills are all Chinese chestnuts on rather poor soil as he explains in his description of the photographs.

This is an orchard of Chinese chestnuts as planted by the Chinese on the richer soils of the low lands which show larger trees. Even when full sized they do not compare with our American chestnut but are old enough to show you that they have not been killed by this bark disease.

These trees show signs of the disease but that they have a high degree of resistance is apparently beyond dispute. This shows the black scar near the top which Meyer diagnoses as the remains of the chestnut bark disease.

The scar there in the crotch of this chestnut tree indicates the degree of resistance of this species. Just how it is going to behave here in America no one can tell but that it would be possible to grow orchards of these Chinese chestnuts with the care which you exercise in growing pears or even peaches I think is a pretty safe guess.

Meyer remarks that this tree is probably a century old and with signs of this disease on it. Here is one that he marks as between two and three centuries old.

This, gentlemen, is the newest arrival in this country coming from East Africa near Zanzibar. In Curtis's magazine there is published an account of this nut after Mr. Playfair a British subject who had lived on the island of Zanzibar. This is one of the most curious and most interesting nuts that has been brought to our attention.

It is borne by a climbing vine the stem of which sometimes reaches six or seven inches in diameter. The fruit is between two and one-half and three feet long and eight inches in diameter, and bears between 250 and 264 of these large seeds about the size of chestnuts and with a delicate flavored. In 1884 this Mr. Playfair sent some of these nuts to England, but we have just discovered them so to speak. They will probably grow in our tropical possessions and we must not overlook the fact that after all there is a distinct drift in our agriculture towards the development of that part of the globe which has been so overlooked by horticulturists in the past. It is not at all impossible that some of you who are here in this audience today will buy that Playfairia on the markets.

I thank you very much indeed for your attention.

THE PRESIDENT: The hour is late. What Dr. Kellogg may have to say I know will interest you all greatly but it might better be said tomorrow when we are fresh and the attendance will probably be larger than it is this evening. If there is nothing further to come before the meeting tonight we will take a recess until 9:30 in the morning.

The convention adjourned until 9:30 a. m. Friday, October 8.

MORNING SESSION FRIDAY OCTOBER 8, 1920

The session was called to order by President Linton at 10 o'clock.

THE PRESIDENT: I wish first to beg the pardon of the membership of the Association for the little time that I have been able to give to the preparation of this particular paper. To illustrate how limited that time has been, starting from Michigan prior to our meeting yesterday I had less than twenty-four hours to get to Washington. It was necessary that I should call a meeting together at a little town in Michigan where the regular train did not stop. In order to get that train it was necessary to send a man to buy a ticket to that particular point and as he climbed off that train I climbed on. The conductor thought we should be held up for a conspiracy for stopping a train of that character. On reaching Detroit there were a few minutes between trains. After landing in Buffalo I found that there were fifteen minutes to make connections, and after getting on that train I found our good Brother Pomeroy aboard and he had some fine drinks and other things from his home farm so that it was really the midnight hour before I could commence on this document.

PRESIDENT'S ADDRESS

HONORABLE WILLIAM S. LINTON, SAGINAW, MICHIGAN

LADIES AND GENTLEMEN:

I well realize that it is an extreme honor that has come to me in having been named as your President, conferring the privilege also of presiding at this important meeting, your Tenth Annual Session. It has been my lot for almost three score years to mingle largely in civic affairs through organized efforts, for man's betterment along many lines. But with all this experience I do not recall any single group, or undertaking, of greater possible and probable value to the people of this country and especially the next and all future generations than the purpose for which we gather today. It is of such vast importance that earnestly and enthusiastically we find foremost in the work, "the best equipped, most intelligent, progressive and successful Agricultural Department" of any government on earth. We are signally honored by the co-operation of one of the most important members of the President's Cabinet, the Secretary of Agriculture, assisting in our program by the presence of leading officials of his staff, all endeavoring in every possible way to supply excellent sustaining foods to mankind, and to add from many choice products of field or of forest, to the joy and comforts of living.

The particular line of effort in which this organization is enlisted is worthy of at least some time and thought upon the part of all persons interested in promoting the welfare of the community, state or county in which they live. Those who will do their share, and there are thousands of them if the subject can be properly presented, can add largely to the food supply of the nation, and provide real delicacies for every table in the homes of the poor as well as in the mansions of the rich. It would be but a few years before we would have in size and quality the aristocrats of the nut family, in walnuts, hickory nuts, butternuts, even beech nuts, the same as in fruits we have the Bartlett pear, the Northern Spy apple, the Naval orange, the Crawford peach, or the Brighton grape.

Work of inestimable value is being done by our membership in propagating improved varieties that will be rich and lasting in results. We cannot, however, afford to halt for this development of species as our own time is too short, but we can cause to be planted millions of seedlings out of which will come many choice varieties of the future. We would have had them now had our forefathers realized what could be accomplished along this line and the necessity for doing it.

Therefore I would urge with all earnestness that the work be not further postponed, but that we bend every energy to bring about an awakening in this matter that will cause general activity throughout the entire United States. There are several ways of doing this, any one of which should bring results. The only question about any of them being, who can spare the time necessary for this work. My pleasant acquaintance with the members of this Association proves you all to be one hundred per cent Americans, standing well up in your business and professions, and leaders in the civic life of your communities. These excellent points to your credit, really deter each and all from giving time throughout the year to the Association's work and permit only the annual gathering and the events connected therewith that are largely spasmodic only in action and effort.

The Association should be made large enough and strong enough financially to provide a Secretary with proper clerical assistance and fair compensation for work well done.

From fifty to two hundred members can be easily secured in every state in which the Northern nuts grow. Officials of government, States, counties and cities are ready to join in the movement. Road builders, owners of cut-over and other lands only need to have their attention called to what can be accomplished and the great majority will unite with us. The work of the American Forestry Association has promoted our cause also, and the establishing and naming of historic trees throughout the land can well be made a feature of our plans. Only a day or two ago a Michigan paper carried the following item:

MOUNT VERNON WALNUT IS THRIVING IN INGHAM

> Mason, Sept. 26.—Summit R. King, a pioneer of Mason, who was present when the Republican party was born "under the oaks" in Jackson county, has evolved a plan for raising historic trees in Ingham county.
>
> In 1906 he visited the tomb of Washington at Mount Vernon and while there gathered some black walnuts from a tree on the grounds. He planted those and his trees are now in bearing.
>
> He has placed a quantity of the nuts in the hands of the county school commissioner, Miss Daisy Call, to be given to the rural schools that the grounds may be beautified with trees planted in memory of George Washington.

Why not have Mount Vernon walnuts thus distributed throughout the Union. Every school boy and girl in the land would be delighted to get them for planting.

The supply would not equal one hundredth part of one per cent of the demand for them. Then select throughout the country other special or historic trees of various kinds or varieties of nuts and still I am sure the supply would not begin to equal the demand. Long ago I began to arrange for nut crops from some of these historic trees, planted by Washington at his beautiful Mount Vernon home, now the Mecca for prince or pauper and all those millions who love the freedom of glorious America.

Those nuts will be planted in the parks and on the grounds of the people of my home city this very year by the children of our schools who are now in their moulding being taught to revere the name of the father of our country.

This very act of patriotism will cause thousands of boys and girls to have fixed in their minds for youth or age the value of planting the useful trees that will in later years produce food of the very best character for the human race. Carry this message into every city, village and school district and the good work will be duplicated thousands of times and then the movement in which we have so earnestly engaged will have brought forth fruit in great abundance so that even the great majority of those living today, and certainly the generations to come must give this organization and its founders great credit for real and lasting benefits that will prevail for centuries to come.

We all desire at this very important period in our existence as an Association, to strengthen our forces and enlarge the scope of our work. To do it at once let me suggest the early choosing and naming of live vice-presidents in every state that may be united with us in membership; also a general committee on legislation. This committee can do much the coming year when legislatures throughout the country will be in their regular session, to cause the adoption of laws similar to the Michigan Statute known as the Penney Act, which provides for the planting of nut and other food bearing trees along the public highways.

It is one of the most progressive enactments in recent years and its good features should be adopted by every State, and the Federal Government as well, by applying its provisions to National highways also.

In conclusion I wish to thank each and every officer and member for uniform courtesies and favors extended to me throughout the year. My only regret being that official duties, extended traveling, and other unforseen demands upon my time have prevented me from giving the close personal attention to every detail of the Northern Nut Growers Association business that it otherwise would have beeen my great pleasure to have done.

My gratitude is cordially extended to each and every member.

Mr. B. G. Foster: Mr. President and Fellow Members: I realize that children should be seen and not heard and I am merely a child in this organization. At the same time I believe under modern conditions children are being more and more heard and the older people are being put more and more in the background. So I am going to take the liberty of making a few remarks particularly with reference to the president's address. This is my first attendance at a meeting of the Northern Nut Growers' Association and I have profited very greatly by it. I have become very much interested in nut culture. In a small way I am stumbling along and learning something of the work and the development of this industry. At present it is merely a fad with me but I do not know but what it may become something more as I get into it. I have been particularly impressed this morning with the address of the president. There were one or two suggestions that he makes that I wish to refer to. I think it is an excellent suggestion to get the children interested in nut culture through historical nut trees if nuts can be secured from such trees and delivered to different school authorities.

Another is the question of having a representative from every state. I would like to inquire from the secretary if some such provision has been adopted.

The Acting Secretary: We have always had a list of state vice-presidents which you will find in each one of the reports. Those state vice-presidents have been selected because of their being the most active members in each particular state but they have never been especially active more than to turn in some communication about their work. I have never been able to get any of them to make any special campaign for new members.

Mr. Foster: Then, as I understand it, the president's idea is to urge these vice-presidents to take a more active interest in the affairs of the association.

The President: That is the point I desire to make.

Mr. Morris: When the constitution of the United States was drawn up it was said to be "insanely ideal." We do not have to stretch our imaginations this morning to the point of a question of our sanity when our president's compositions are put before us. His paper seems sanely ideal. There is only one thing that interests a child more than history, (unless it is Sunday school), and that is a dollar bill. Now if we are going to approach the children let us introduce the pragmatic side of giving the child an object lesson showing where the planting of a nut tree will bring a return in dollar bills that will ripen along with the leaves every autumn instead of just leaves alone. We should have in connection with various educational institutions a few object lesson trees. It seems to me that this is a responsibility of the state. A number of responsibilities have been put upon the state in the past and a number of responsibilities have been put upon the educational department in every state. So many of them, in fact, that hardly any legislature will stand without hitching when there is a question of diversion of "pork barrel" funds away from river and harbor appropriations toward education. We can show that very much larger river and harbor requirements will follow if our children raise so much of this great new feed supply that we have more things to transport. The question may be taken almost seriously from that point. In fact if you give further consideration to the matter it seems to me that this statement of mine, made somewhat in the spirit of levity, is like many other statements made in the spirit of levity. It has a basis in real fact. The development of that basis I will leave to your imagination.

Mr. McGlennon: In regard to Dr. Morris' remarks relative to the financial consideration, that appeals to me with peculiar force and I think we can very materially provide for it in an enlarged membership. For some time I have been giving very serious thought to the subject of enlarging the membership of the Northern Nut Growers Association. I think quite a substantial gain was made last year and I believe that a very large gain can be made this year. I think we ought to have a membership in the neighborhood of a thousand anyway. I believe we can increase it this year to at least 500. Probably I am particularly fortunate in having a source of supply of membership that perhaps the rest of the members have not, through the L. W. Hall Company. This company is handling our improved filberts and is getting a large number of orders and the people who have received plants during the past couple of years seem to be very much pleased with them. In many instances they have already borne fruit. The Hall company has received splendid letters in regard to them. In the fall and in the spring the Hall company sends out a large number of catalogues. This fall they will send something like a thousand, in the spring from five to seven thousand and in each of these catalogues the literature of the Northern Nut Growers Association can be included. We experimented a little last year along this line and I believe Mr. Bixby will bear me out in saying that there was quite a tangible response. I got a few members in and about Rochester through friends but I believe that I can almost guarantee at least a hundred members myself this year and probably more, particularly through the medium of the Hall agency. But, as Dr. Morris says, or practically said, there is nothing in this world that talks louder than a dollar so I thought I would come here prepared to back up my position and to guarantee at least 25 members for this year.

There is another matter to which I think we ought to give serious consideration and that is the matter of the American Nut Journal. It is the only nut journal, as I understand, in the country and I believe there is an inestimable future for it if we seize our opportunity or enable Mr. Olcott to seize his. At this time, I believe, he is not getting the support that he ought to have from this Association and the other nut associations of the country. He is a very able man, at one time the editor of the Post Express in Rochester, the classiest paper in Rochester, and we have some classy ones there, he is an educated man of large experience and very versatile and it seems to me he ought to have substantial support. So I came here with a certified check for 25 memberships to the association and 25 subscriptions to the American Nut Journal as a guarantee of good faith. I believe I can add 75 more.

There are some other things that I think we ought to give consideration to and that is the work that is being done by Dr. Deming and Mr. Bixby. I think these men should have special and substantial support, real support, money support, so that they can do things as they ought to be done at the time they ought to be done. I think we are selfish in asking these men to give so much of their time and attention and money to the affairs of this association without giving them better support. If we have more members we will have more money and more members will bring more members. This propaganda will be spread far and wide. The interest in nut culture is growing by leaps and bounds. I think this is the time to strike as a scientific organization.

I think the Northern Nut Growers' Association is the most scientific of all of the nut growing associations. That is something of a guess, of course, but if they were put to the test I believe it would come out on top. Anyway put me down for the very best efforts that I can render to the end of building up membership and financial support of this association. It seems to me that with men like Deming, Bixby, Morris, Littlepage, and others whom I could mention, the scientific and practical ends of this association are being pretty well taken care of. We meet here in association and it is very lovely, something of a mutual admiration society; we go away and are likely to forget until it is about time to get busy with another meeting. Now it seems to me we ought to be busy all the year doing something so that when we come to the meeting like this we have something to report in the way of membership and money. That will make possible these plans that Dr. Morris suggested. I was unable to hear the president's address but it seems to me that more attention should be given to the matter of finances of this association and the membership.

I just want to add a remark or two in regard to Mr. Vollertsen who is going to read a paper on the filbert. We have found, and we certainly believe, he and I,—and he knows more than I do because he is on the ground all the time—I look after the sales end of it,—we have found that several of our smaller varieties of nuts are, in our estimation, decidedly superior to some of the larger varieties. While we believe that the consumer is going to give first thought to size he will be making a mistake if he passes by some of our smaller varieties which are splendidly filled, filled to capacity, very rich, and thin-shelled. I do not want the smaller varieties passed by.

Mr. Jones: I think the nurseries would be glad to co-operate in the getting of new members and it has occurred to me that they might like to donate trees to new members or plants or something that would attract them. That might be worked up with the secretary if it would be any great attraction for getting new members.

The President: I think that is a very good suggestion.

The Secretary-Treasurer: Mr. McGlennon spoke of the amount of time that the secretary had to give to the work. I can speak from experience and I can speak frankly because the secretary and the treasurer are different persons, although the office of the secretary-treasurer has not yet been officially divided. The treasurer is supposed to have not much to do and the secretary to get the bulk of the work.

While the finances of the association at the present time are not such that we can recommend the paying of a salary to the secretary, yet there should be a salary paid to the secretary sufficient so that he could employ someone to relieve him of a good portion of the detail which comes on him. I know by experience what that is. I would like to ask the association to authorize the treasurer to pay the secretary a salary not exceeding $500 a year. That is what it ought to be or whatever portion of that the finances will permit for this purpose. In offering that I do not want the secretary to think that he must begin to spend the money right away, because it is not in the treasury, but I have a lot of faith that we will get more money and will be enabled to pay that. So I want to ask your authority to do it.

Mr. Olcott: I would like to second that motion and also to endorse what Mr. McGlennon said, and Mr. Jones, in regard to new members. I think that is one of the things we need as much as anything right now and that we can get them if we go after them. I know that our secretaries, both Mr. Bixby and Dr. Deming, have done a great deal of work and that it takes a great deal of work to get new members. There are a good many other things on the schedule for the treasurer and secretary to do besides that. We have a system of vice-presidents for each state and one of my recent ideas has been that he might form the center for an increase of membership in his particular state through co-operation with the secretary of this association. If we do not keep after this matter after we adjourn we shall be just about where we are now a year from now. It is activity that counts. I am sure that if we provide for a salary for the secretary we will get busy and provide for that salary, so I make the motion that the treasurer be authorized to pay $500, or any portion of that amount that the association can afford, to the secretary.

Dr. Morris: I second the motion.

The motion was carried unanimously.

The Acting Secretary: You will notice that, in the question box, question number 12 is in relation to roadside planting of nut trees. More people, it seems to me, are interested in the roadside planting of nut trees than in any other one phase of nut planting. I get many questions about what is desirable to plant on the roadsides and many suggestions that the Association particularly interest itself in encouraging roadside nut planting. Therefore it seems to me that it would be advisable that this association should appoint a committee which should consider all the factors concerned in roadside planting of nut trees, and should draw up a bulletin which can be sent out to officials and people who make inquiry and to all people who are interested, giving them exact and specific information on the subject of road planting in each state, considering each state separately and suggesting what nut trees had best be planted in that particular state.

Mr. Jones: I think Dr. Deming's suggestion is a good one but I do not like the idea of waiting another year. I think we ought to do that right now. There is a big opportunity for producing new varieties. For instance, get each state to take up planting of the very best nuts they can get and then plant the seedlings on the roadside and we will get new varieties that will be better than anything we have now. If you plant common nuts you will get common nuts but if you plant fine nuts while you will still get a large number of ordinary nuts you will get some that will be fine and some that will be better than anything you plant, if you plant enough of them. I think that is the greatest opportunity we have in roadside planting.

The Acting Secretary: I think this is the proper course to follow, that the committee appointed should have power to issue a bulletin without waiting for the next convention. I would like to see our president at the head of the committee.

Mr. Jones: I would like to see them get the nuts this year. There is a good crop of nuts this year, black walnuts, hickory and other nuts.

The Acting Secretary: I move that a committee be appointed by the president, the number to be determined by the president, and our president, Mr. Linton, to be the chairman of the committee, to consider the compilation and issue of a bulletin on roadside planting of nut trees.

Mr. Bixby: I second the motion.

The motion was carried unanimously.

Mr. Pomeroy: You will find this argument probably will be used by some that the trees will be destroyed by automobile parties and children hammering the nuts off with sticks and stones. I have a few nut trees planted along the roadside now that are in bearing. They have been in bearing, some of them, six or eight years and they are within forty feet of a school house with a large attendance of children. I have had no trouble at all with the children gathering the nuts or tampering with the trees. Of course they take a few—I would take them if I were in their place.—but none of any consequence. Automobile parties passing along there seldom bother them—although they are worse than the children to tell the truth. You will hear that argument, that a food producing tree along the roadside will be injured by travelers.

DR. MORRIS: Mr. Pomeroy's remark relates either to one of two things, to bad nuts or good children. We will not have that feature throughout the country at large. It is an important point, however, but if this is to be committee work it seems to me that perhaps Mr. Pomeroy and others might offer their testimony at the time there is a committee meeting for bulletin purposes and we ought not to go on with this discussion at this time.

THE PRESIDENT: The next thing on the program is an address by Dr. William A. Taylor, Chief of the Bureau of Plant Industry, on "The Place of Nut Trees in our Northern Horticulture."

THE PLACE OF NUT TREES IN OUR NORTHERN HORTICULTURE

Wm. A. Taylor, Washington, D. C.

We are somewhat inclined in America to consider none but the big things worth while.

We like to do the big things and the quick ones. To organize billion dollar corporations; grow billion bushel wheat crops; to have the swiftest motor boat or auto; to receive the largest income per man. per year, or per acre. Concentrating our attention on cap sheaves and superlatives rather generally we very easily lose sight of features less conspicuous though highly important.

Such an one is the rational development of nut culture in our Northern States. Since the scouring of our chestnut forests by the Asiatic chestnut blight has practically eliminated that nut from consideration for orchard planting in the infected territory until resistant varieties yielding good crops of nuts of acceptable quality are obtained or developed, we can hardly say with assurance that we have any nut of proved adaptability in sight which is worthy of planting on an extensive scale for its crop alone, on productive agricultural land in the Northern States.

Along the southern fringe of "the North" as in Delaware, Maryland, southern Ohio, Indiana, Illinois, and Missouri exception in favor of the hardy varieties of pecans should probably be noted but in the light of present knowledge orchard planting of the commercially important almond, Persian walnut, and pecan must be left to the Pacific Coast and in the South.

This fact has been so generally recognized that we have been inclined to give up all thought of attempting nut production in the North merely because large scale operation is not attractive. There is much ground for belief that this view is erroneous and that there is need for localized planting.

If the world war taught any economic lesson to civilized men which they should remember and act on, it is that low cost food reserves should be provided against possible exigencies. They are not needed every year but when needed their value can hardly be estimated. Only to a limited extent can such reserves be accumulated out of the production of our ordinary cereals and commonly cultivated crops. Potential reserves in the form of fruitful nut trees can be established at relative light initial investment or of continuing care and labor on almost every farm and by many a roadside in much of our farming territory. Black walnut, butternut, shag bark, shell bark, beech, and other hardy, long-lived native trees can be established at low cost in large numbers for beauty, shade, and food production. Nor should the possibilities of Persian walnut, Japanese walnut, and native hazel be disregarded in favored sections.

While none of these are entirely free from plant diseases or insect pests, they are, when once established, capable of maintaining themselves fairly clean and sound with little expenditure for spraying or other attention during the growing season when the peak load activities of the farm are on. Why should not their planting receive more attention and encouragement from our horticultural and other rural societies? For rough land and roadside planting they are decidedly more practical in most sections than any of our fruit trees, substantially all of which require spraying and tillage to maintain productiveness, or in fact to avoid becoming nuisances by harboring pests to contaminate the commercial orchards of the neighborhoods. While much has been said in America in commendation of the roadside planting of fruit trees so common in portions of Europe, and while there are possibilities of useful development along this line, most American efforts in this direction have proved disappointing because of the impracticability of giving the trees the care and attention they require. While often promising at the start they have quickly become infested with San Jose and other scales, borers, blights and rots which can only be prevented or controlled by systematic and thorough remedial measures, rarely possible on rough lands, in fence rows and on roadsides.

If this type of nut culture is sufficiently promising to be worth while, do we not need to attack its problems from a somewhat different angle than has become our custom with the trees which are to be grown under intensive cultural conditions at high maintenance cost, such as more and more characterizes our orcharding?

It has seemed to me for some time that in this field we need to return in our study of varieties and strains of nut trees to the standards and ideals of the earlier and ruder period of American Pomology when rusticity of tree, including storm endurance, freedom from troublesome diseases and insect pests, as well as productiveness and dessert quality were the primary consideration next after satisfactory productiveness and quality of crop.

This and other like societies might well devote much effort to the securing of performance records of promising individual nut trees, whether wild or grown by man, with a view to locating those which, whether bearing nuts of the largest size and finest quality or not, possess the inherent ability to bear regular crops of fair quality under the rough and tumble conditions of the average fence row or roadside of the region to which they are adapted. Can a more alluring and fascinating field for search throughout the growing season be suggested or one more likely to interest the growing army of nature lovers, whether dwellers in country or town?

Once located and proved worth while through a sufficient period of cropping such trees, especially of black walnut, could be made available through nursery propagation for rapid dissemination for experimental planting throughout the areas of their probable adaptability.

Do not understand me as in any sense discouraging the continuance of painstaking experimentation with a view to finding or developing varieties suited to orchard planting in those scattered, favored spots where conditions make success reasonably probable. My point is rather that in our northern states by far the largest potential production of nuts is through waste land utilization and dual or triple purpose planting, such as nuts and shade and in some cases ultimate yield of highly valuable timber.

In short, widespread recognition of the importance of nut-tree planting as a side line. This deserves attention during the next few years because of the practical certainty that as our nationwide development of permanent highways proceeds, roadside trees planting on a large scale is sure to follow. When undertaken it should be on a solid foundation of experience especially with regard to the climatic adaptation, soil and drainage requirements, varietal characteristics, such as habit, vigor, pest resistance, and productiveness, all of which are fundamentally important where the use of the land for a century or more is involved. What has been said with regard to highway planting is still more important with regard to the planting of the farmstead where ill-suited trees become a source of grief rather than of satisfaction.

Side line planting of nut trees in our northern states is practically sure to develop on a large scale during the next twenty-five years.

How can the essentials to its rational development be most promptly and accurately determined and most effectively disseminated among the people?

Dr. Morris: Apropos of side line planting, Mr. Jones some three or four years ago gave me a very handy little orchard saw. He said that when I went around the orchard on Sunday morning before church time if I had this saw with me I would find something to do. Well when I have this saw in my hand before church I find so much to do that I cannot go to church. Now if we take up tree planting as a side line it is going to be the little cap that will fire off the big gun. I think we may safely urge side line planting of nut trees believing that men who take up the side line will be drawn into putting them out on the very best land they have.

The Secretary Treasurer: Dr. Taylor said "if the trees were suited to the climatic conditions." I would like to ask him about that. I get many requests from people from various parts of the country as to what trees would succeed in their sections. As a matter of assistance in the future I would like to ask Dr. Taylor how he would go about finding that out.

Dr. Taylor: Mr. President, my first step I think would be to put that question to my neighbor who had been there longer than I, who had had his eyes open and who had had opportunity to observe. There is great risk in undertaking to project into investment propositions theoretical considerations with respect to particular varieties of trees. Our guide, our only guide, must be actual, observed behavior of the trees that we have under consideration. Of course we can draw some broadly general lines. We do well in a matter of this character to draw those lines rather conservatively and make clear that he who passes beyond the line does so at his own risk. He does it deliberately experimentally rather than upon what you might call an investment basis. The important thing, it seems to me at this stage is to observe and record the facts with respect to the trees now growing. That, of course, is particularly true with regard to the native trees which, without doubt, must take the lead in side line planting throughout the northern states. That is to my mind the important thing. Trees exist in large numbers. They need to be located and studied not merely observed on one bright sunny afternoon when everything tends towards satisfaction and optimism, but through the eyes in a way that will make available not only to the observer but to the rest of us the facts in regard to those trees.

The President: The next number on our program is Tree Planting for Definite Purposes, by Charles Lathrop Pack, President of the American Forestry Association. Mr. Pack has notified us that he is unable to be present, but has forwarded his paper.

GREATEST POWER PRODUCING ENGINE IS THE NUT TREE—MAKE NUT TREES YOUR MIDDLE MAN IN FIGHTING FOOD COST

Charles Lathrop Pack, President, The American Forestry Association

On every hand we hear the call for power and more power. Every scientific genius in the world directs his attention to increasing power units in the struggle for world trade on which we are entering following a World War. Business calls for quicker transportation and the motor world answers with master motors; railroads are being or have been electrified; water power developments are being pushed in many parts of the country. The business world calls for more power and the aeroplanes answer with the delivery of mail and soon we are told it will enter the strictly commercial field. But what of man? What is being done to make him stand up under this terrific strain; this keener competition? What of the food that must keep him going? What of products that must be put before him with the middle man standing between?

A nut bearing tree is the most powerful engine in the world if its fruits be properly used. If the people of the United States could have nut bearing trees for their "middlemen" in the fight to bring down the High Cost of Living it would come down quickly.

Nuts are the most important of all tree crops because they are the richest natural food substance known. A nut is Nature's supreme effort to pack as much nourishment as she can into the smallest possible space for the nourishment of the future young plant. That some people are aware of these food values is evidenced in the nation-wide tree balloting now being conducted by the American Forestry Association for the selection of a national tree. In this voting nut bearing trees are in the lead. Many nuts contain as much musclebuilding food as rich cheese, a third more than beef steak, twice as much fat as cheese, five times as much as eggs. Chestnuts contain 70 per cent of starch, nearly as much as the best wheat flour and four times as much as potatoes. Peanuts and hickory nuts are three times as nourishing as beefsteak. When you think of it that way it hardly seems to be the thing to casually munch triple extract of beefsteak from a street nut stand or after a hearty dinner. Say a fifty-pound bushel of black walnuts costs two dollars. It yields 12 1 2 pounds of meats whose fuel, or food value is 37,500 carlories. The same number of calories in beefsteak at fifty cents a pound would cost more than fifteen dollars. A bushel of hickory nuts at three dollars yields as many calories as sixteen dollars' worth of round. steak.

Out in Kansas the other day a single walnut tree stump, grubbed out on the banks of a creek in Geary County brought the farmer $250. When the call of war came we found we had to hunt for black walnut to make gun stocks and aeroplane propellers. In some towns in Ohio, citizens cut the walnut from their streets so high was the price offered for this wood. So let us make trees, particularly nut bearing trees, the memorials or the proper setting for memorials to the men who offered their lives to their country in the World War. Let us line our highways with trees and make them Roads of Remembrance. In this way the trees will impress their value upon millions of our people. Put these trees where they can spread the message of production and beautification combined. Take their seeds and pass them on to other places where the message will be spread still further.

Michigan is planting apple trees along a Victory Highway. Tourists will pick those apples some day. That is just what Michigan wants them to do. Michigan wants the tourists to carry the fame of Michigan's apples to the southern tip of Florida and to the northern tip of Montana. Why do not your members of this Association of nut growers follow the example of Michigan by planting nut trees along the highways of the state they represent. The American Forestry Association is glad to co-operate with anyone who wants to spread the message of the tree. The people of this country have a responsive ear to campaigns of education. The American Forestry Association's call for memorial tree planting has demonstrated this. Trees are being planted by the American Legion, the Service Star Legion, schools, church congregations, all sorts of organizations and individuals throughout the country. The tree is the one thing with its ever renewing life symbol that meets the requirements of a memorial. The tree is the memorial the individual can erect, care for and protect. Then just consider what the tree gives the planter in return– an affection that only comes from the bosom of the earth, to which the loved one for whom the tree was planted, has returned.

You gentlemen are missing a great opportunity if you do not get squarely behind the American Forestry Association and help it spread the message of the tree, Nature's masterpiece and greatest gift to man, and in doing so urge the value of planting trees that produce food wherever such trees can give better service than those which do not produce food.

THE PRESIDENT: The next number on our program is A Nursery of Improved Filberts, by Conrad Vollertsen, of Rochester, N. Y.

A NURSERY OF IMPROVED FILBERTS

Conrad Vollertsen, Rochester, N. Y.

Again I have prepared a paper on the growing of Improved European hazelnuts, but through practical experience perhaps a little more positive in my statements.

It is well known, a well established fact, that our common native American hazelnuts both Corylus rostrata the beaked hazel, and Corylus Americana the American hazel in their present state of appearance are for various reasons not very well adapted nor desirable for cultivation, particularly Corylus rostrata, a very slow growing variety with unusual small and hard shelled nuts, so small and hard that even the rodents of field and forest refuse to gather and eat them. The only value I can see in this variety is that it may prove to be a good pollenizer. Corylus Americana is a better grower with nuts a little longer than the preceding variety, but a short life plant and therefore not even fit to use for stock to graft on and should never be used for that purpose. There is in fact by both varieties lots of room for improvement, which only could be gained through scientific hybridization and which we hope will be realized to a certain extent at least in a comparative few years.

It is true a few better varieties of the American type like the Rush hazel and one or two others have been discovered or produced, but even they do not favorably compare with the better European varieties and the consequences are: If we want to grow hazel-nuts, we are at the present time and until such time has arrived, when through scientific hybridization substantial improvements over the present state and condition of our native hazel-nuts has been gained, actually compelled to rely on some of the European varieties, compelled to grow and cultivate a large assortment, from which to select the proper varieties for the different sections of our country.

I therefore have chosen as a title to my paper The Growing of Improved European Hazel-nuts in Nursery and Orchards in the State of New York and other Eastern and Northeastern States. I have chosen this title, because it indicates that a nursery of European hazel-plants is in existence and that orchards are planted, which is really equivalent with growing of European hazel-nuts for commercial purposes, otherwise there would be no need of such nurseries and no need of hazel-orchards.

I have alluded to this very subject in an earlier paper, but was at that time not as convinced of the final success as I am today.

We have since not only experienced a very severe and constant winter but a winter in a great many ways rather peculiar and unusual with early and heavy snowfall, which prevented in some sections of the eastern states the freezing of the ground in spite of the bitter cold. We have since seen another season of buds and blossoms and balmy breezes passing away never to return and a season of harvesting our fruit is rapidly approaching its end, but, ladies and gentlemen, during this now vanishing and for some sections of our country rather peculiar season, great opportunities were offered the close observer to study and investigate the different problems concerning the growing of European hazel-nuts in the northeastern states of our country.

Let us hope that not all of these opportunities and chances offered us have passed unobserved, but that some of those perplexed questions of filbert or hazel-nut growing in the east have been solved. To me this past season, though somewhat unusual, was very interesting and above all very instructive to growers of hazel-nuts.

It is my opinion that the peculiarity of this season has wonderfully aided to solve many of those unanswered questions about the growing of European hazel-nuts for commercial purposes in the Eastern States. Through practical experience and close observation throughout the whole season it certainly has convinced me beyond the slightest doubt in my mind that some varieties of European improved hazel-nuts properly selected for the different states or parts of the Eastern States can be profitably grown for commercial purposes . It will of course require time and work to find out the right and proper varieties for the different sections of our country. For Western New York I could select eight or ten varieties from my nursery that would prove A No. 1 for that part of the state of New York, probably a number of the same varieties would do equally as well in parts of adjacent states, but of that we are not sure until actual planting has been done and thoroughly tried out. The question now is how and where can we obtain the necessary varieties of hazel-plants, as the importation of most kinds of nursery stock, including all nutbearing trees from foreign countries is at the present time very much restricted, practically prohibited. To my judgment there is but one way out of this, if we want to grow hazel-nuts of foreign origin.

We are under the existing circumstances, as stated before, simply compelled to grow our own plants. And this is being done. And to prove that it can be successfully done I will try to describe and demonstrate the method I am using or employing in my nursery for propogating the hazel- or filbert-plants. I still adhere to layering as the best method of propagating the hazel, large numbers can be produced in a comparative short time, if sufficient stock-plants are at hand, and plants on their own roots have many advantages over grafted or budded stock, as there is no wild growth to combat with, so deceiving and aggravating to the people who plant hazel-nuts and liable to choke or kill the growth or bud, that eventually nothing but the wild stock will remain.

The general assertion or claim, that grafted or budded hazel-plants are more productive, more prolific, than plants on their own roots does not hold good to all varieties, as I have both grafted plants, as well as plants on their own roots of bearing age and have so far not been able to see any difference in bearing, now in the size of the fruit or nuts, but would like to have it strictly understood that this opinion of mine, gained through experience and observation in my nursery only should not be taken as final, as I only have a few grafted varieties to watch and to compare. In fact I have every reason to believe that grafted hazel-plants of some varieties, will be more prolific and bear more regular, but have had so far no proof of it, but will do more grafting of other varieties to establish the fact more positive and report the result later. For the buying public at the present time, plants raised from layers on their own roots should be preferable and layering as a method of propagating the hazel-plants resorted to until the general public gets more and better acquainted and familiar with the growing of hazel-plants.

The layering of hazel-plants in my nursery is done from imported stock or parent-plants planted on ordinary farm land thoroughly worked and well manured 12 feet apart each way. Two year old plants are selected for such planting, they are allowed to grow about two seasons before we layer them, which would be about in the autumn of the second year, at that time there should be besides the ordinary growth of the original plant, some fine young shoots growing from the root, which could be, if so desired, layered, together with other branches of the plant, but is not always advisable, neither is it necessary, as the plants selected for parent stock should be well branched and well able to furnish wood enough for the first layering without those one year old shoots.

I will now try to show to you, as an illustration and at the same time try to explain the reason why they should not be layered, simply because they are there. It is all well and good to layer them, if the scarcity of wood of a choice variety demands every branch obtainable and they will grow all right, but will never produce as nice a root as layers from a two year growth. These are the young so-called one-year-old shoots I have referred to, really just this season's growth, perfectly straight without any laterals. Now in layering them a little opening long enough for the branch and about 3 to 4 inches deep, the same as for layering other branches should be made in the ground and the young shoot or branch carefully bent and placed in the opening and well anchored or fastened before the ground is filled in again, otherwise our changeable winters may heave and loosen them, we will then at the best of it eventually grow but one plant from each of such shoots and generally poorly rooted at that, that is a root rather long and crooked not very easy to plant and still harder to dig, very much like this specimen a layered one year old shoot, just taken from a parent plant.

We cannot improve much on this awkward root as it is impossible to shorten the bend in layering them, but we can improve on them, if we allow the one year shoot or growth another season to grow, we will then at the end of the second season have an altogether different branch before us, a branch in appearance about like the one I have here. You will notice the terminal bud of the last year's growth has made a growth of about 12 to 15 inches during this second season, besides that, you will see from 4 to 7 fine laterals all of them including the growth from the terminal bud fit for layering and all of them will bend easily and can be placed almost perfectly straight in the ground, which will invariably insure finer and better rooted plants and more of them, than a one year growth can produce, as is shown in this specimen from a two-year-old branch I have brought with me, this demonstration plainly shows that there is nothing lost in waiting two years with the layering of young branches, as our reward will be more and better plants possibly a little smaller, but better growing plants than the longer layers from a one-year growth, besides that, a branch with 4 to

7 laterals can be layered about as quick, as a one-year growth, as the same opening in the ground made for one layer is fully sufficient for 6 or 7 on a two-year old branch. All layered branches or little shoots should be cut back to about 3-4 eyes above the ground and remain in the ground about one year, the earth around the parent plants and between the layers must be well worked throughout the whole season and if necessary mulched with half rotten manure. After the layers are well rooted, they should be taken up, cut apart and properly trimmed and planted in the nursery row, where they remain until large enough for market or orchard planting. There is but very little pruning of the young hazel-plants necessary until they are planted in the orchard. I will therefore not dwell on the subject of pruning just now, but will leave the propagating and growing of the hazel or filbert-plants in the nursery and try to make a few remarks about the hazel or filbert orchard. I should perhaps have mentioned the growing of seedlings for stock to graft or bud upon before I begin my talk on the hazel-orchard, but as there is but very little to be said about it, I may as well refer to it right now.

It is very difficult at the present time to import the ordinary wild hazel (Corylus avellana) from Europe for grafting purposes. We therefore are obliged to raise our own stock. This can well be done by sowing the seed or nuts or by layering of European varieties, we are in possession of. I have among my imported varieties several of which the fruit or nuts are too small and not at all satisfactory for commercial purposes, those varieties I am layering with that point in view to use them for stock to graft upon only. Such stock can also easily be grown from seed or nuts. It has for me so far not been necessary to grow seedlings, as I had stock enough from layers to graft upon, but have found any number of seedlings on my ground from nuts dropped from the plants and not gathered or destroyed by mice or squirrels so I know the seed or nuts will readily grow. Nuts can be sown in the fall quite successfully providing they are safe from mice, otherwise they should be stratified and kept from freezing during the winter. I will leave this subject now and call attention to the hazel or filbert orchard. If the planting of such an orchard is planned, the soil and location should be well considered. Ordinary farm land well worked and fairly well manured and not too wet will answer the purpose, providing it is an open piece of land well exposed to sun and air, as the hazel-nut requires both and a good deal of it in order to perfectly mature its fruit.

In planting the orchard, three or four varieties should be used on account of better pollenization and plants about three to four years old planted. Varieties that naturally grow more conical or pyramidal shaped could be planted about 12 feet apart each way, but the more spreading varieties like the Lamberts and others I would advise to plant 15 feet apart each way, as part of the land between the rows can well be utilized for low growing crops for several years to come and thereby prevent the waste of land. It is not necessary to plant an equal number of each kind, if three or four varieties are chosen for the orchard, we may select say two very prolific kinds and add a few plants of other varieties to mix in for pollenization, which will fully answer the purpose. Before going any further with my talk on hazel or filbert orchards, I should emphatically recommend the thoroughly working and preparing of the ground, as it is a very essential part of the operation and a necessity to the final success. It is a mistaken idea that a hazel orchard will take care of itself, the ground should be well cultivated and kept free of grass and weeds. Barnyard manure or other fertilizers should be resorted to, whenever the ground shows a necessity thereof, neither trees or fruit can be grown successfully on poor and exhausted soil. All filberts or hazel plants are naturally unclined to produce a number of suckers or young shoots grown from the root, they should be removed as soon as they appear, it will stop when the plants grow older. Standard trees with a short stem say 10 to 15 inches should be planted in the orchard, if such plants could be had. It should be our aim to try to grow and prune them with that point in view to raise such plants, as they are then easily taken care of. This actually brings us to the operation of pruning our hazel plants, which is in every way quite an important part of the growing of hazel nuts. At the time of planting all plants should be cut back, the same as is done to any shrub or tree when newly planted, but after that the hazel being more a shrub than a tree should be pruned every year with the center well kept open all the time, all weak and unnecessary wood or branches in the middle of the plant should not be cut back but entirely removed, also the young growth of most of the branches should be removed to just below the terminal but of the previous years growth, as I will show you on a branch I have brought with me.

If we will treat the plants in our hazel orchards as herein described we should not experience any difficulty in raising a fairly good crop of nuts, if the proper varieties are selected. Insects have so far not troubled in the least. a few tent caterpillars appeared in its season. but were soon destroyed by birds. We should not allow our hazel plants to grow too tall, 12 to 15 feet should be the maximum height, after that the tall growing branches should be greatly reduced. or gradually removed. as there is generally young growth enough to take their places.

During the severe winter of 1919 and '20 most all catkins or staminate blossoms above the snowline in our nursery were frozen, also part of the wood of a few varieties were more or less frozen, of which due notice has been taken. They will be closely observed during the coming winter. Only a few of the staminate blossoms that were well covered under snow developed perfectly and the result was a very small crop of nuts on most of the varieties, but all the varieties had some, even those more or less frozen plants. It plainly shows that but a very few catkins are necessary for pollenization. even over a wide area. There will be failures caused by climatic or atmospheric disturbances in our hazel orchards as well as in all other orchards which we cannot control nor prevent, but that should not discourage us as long as the prospects of fair crops are otherwise all right. the selecting of varieties. the proper pruning of our plants. the control of insects and the location of our hazel orchard is all in our power and should if properly exercised almost guarantee a fair crop and insure a fair profit from each acre so planted, providing the proper varieties are selected. Before coming to a close with my paper it seems to me justice is not quite done to the hazel proposition if I would not mention the beauty and pleasure thereof. the beautiful appearance of an hazel orchard and the pleasure and enjoyment it affords us. not from a financial point of view only in gathering the nuts, etc.. but from other sources as well. No other orchard will in a comparatively short time appear more like a natural grove than the hazel on account of its characteristic compact growth and dense foliage. so attractive and inviting to our song and other insectivorous birds for hatching and rearing their young. the constant warbling of the different birds from early spring until late in summer. the building of their nests. the feeding of the young. all affords endless pleasure and enjoyment to the close observer. Now October is here. quietness reigns in field and forest. also in the hazel orchards birds are silent. a number of them departed for warmer climates. others ready to leave us. butterflies and other insects have disappeared. nuts have been gathered. and the leaves are falling. death. decaying and destruction seems to be dominating all around us.

but our hazel orchard, though remarkably changed, still retains a certain part of its former beauty, as the little catkins the staminate blossoms now become more conspicuous, an ornament to any catkin bearing tree throughout the winter, and a pleasure to look upon. There is no reason for discouragement, nature is not dead, only at rest, where we see death and destruction, nature in reality celebrates a new beginning.

The close examination of our hazel orchard at this time will fully convince us that vegetation is still alive and active. Examine the leafless limbs, notice the beautiful staminate blossoms, notice back of the falling leaves the life, the thrifty little bud, a sure and positive promise of a coming spring with the early pistillate hazel blossoms, a great consolation and a great source of pleasure and enjoyment to all. Why not combine profit, beauty and pleasure? Why not plant a hazel or filbert orchard?

Mr. Jones: I would like to ask Mr. Vollertsen if he has tried layering the two years growth and rooting the one year branches thereon instead of layering the one year growth. The one year shoots would no doubt make larger plants at one year but you get a larger number of plants by layering the two years growth and rooting the branches.

Mr. Vollertsen: I have found that these smaller plants will be better plants.

Mr. Jones: What about rooting these and then transplanting. Don't you suppose you gain by rooting those and transplanting in a year.

Mr. Vollertsen: If these were all apart each and every one would make a good plant. I know from experience that they will grow faster a great deal faster than these long roots. There is a plant that has been planted one year from a layer. It is a one year growth. This is a two-year.

The Secretary: I would like to ask Mr. Vollertsen if the soil makes a difference in the way in which they grow. That is if a sandy soil or a clay soil is better adapted.

Mr. Vollertsen: Well I must say if we had sandy loam the plant would grow better and it is more easily worked. Too heavy a soil is not so good.

Prof. Close: I would like to ask Mr. Vollertsen what method of grafting he prefers and just when he would like to do it; if he has any choice of time and also the method of budding and the method of treating the bud.

Mr. Vollertsen: We really should have the common European variety to graft on. Though these are a little small we do graft on them and they do grow well.

Prof. Close: Do you whip graft or cleft graft?

Mr. Vollertsen: Either way they grow easily.

Dr. Morris: I would like to make one remark. I have grafted hazels using the paraffine method from April until September, every month between April and September and have had them grow. The ones I grafted in September were winter killed but up to the sixth of September we have had them pull through the winter.

The President: I do not desire to be placed in the bragging class but as a Michigander several things have been brought to my notice very recently that cause me to take pride in Michigan. As I landed in the fine central station in Washington it occurred to me that a senator from Michigan, James McMillan, had caused the old railroad stations in the District of Columbia to be cleaned out and the fine new depot established in place of them. For his good work one of Washington's parks bears his name. The plans for the new Union Station were prepared by Mr. Spencer, an engineer from Michigan. Passing the Senate Office building I realized that another Michigan Senator, Senator Charles E. Townsend, was at the head of the national road movement in the United States, being chairman of the Committee on Post Offices and Post Roads, fully in accord with the tree planting plan that we have mapped out to be carried on on the public highways throughout the United States. Picking up the program showing what our work might be at this convention, I find five Michiganders noted thereon, a fair proportion of the program. Picking up the morning paper, if you please, you will find that Michigan has been advanced in population beyond the other states. You will find that our city of Detroit has passed a number of other great cities, going from tenth place to fourth, becoming one of the four cities of the United States with a million inhabitants. So you see we have a prosperous state. And we have good men in Michigan that have helped to make it so. Going into a railroad station in a Western city within the past two or three weeks this occurred. The morning paper had stated that the candidate of a great political party to the presidency of the United States was on a train that had been ditched, that the engineer had been severely injured and a number of others on the train; that the distinguished candidate himself had been badly jarred and might possibly have been injured. An hour or two after this first report came from this accident the news boys were calling on the streets: "Extra, extra." Naturally we thought it would be a continuation of news relative to this railroad accident and immediately I purchased a paper. What do you suppose its heading was? In great type three inches high: "Henry Ford has reduced the price of automobiles." Henry Ford perhaps is the best known Michigan citizen today and when we get the river and harbor appropriation that my good friend Dr. Morris referred to not long ago you will see the Washington steamers going up the St. Lawrence River and loading at the seaport of Detroit, carrying out the products of Michigan, we will hope the cargoes of nuts to which he referred. But next to Henry Ford I am sure that the best-known citizen of Michigan today is the next speaker upon the program. He needs no introduction to you. He is one of the pioneers of this movement and in my opinion has done more than any other man in this day and age to promote health, to promote good morals and to benefit the race in many ways along the lines that he has chosen. I take great pleasure in presenting Dr. Kellogg of Battle Creek, Michigan. (Applause).

Dr. Kellogg: Mr. President, Ladies and gentlemen. I fear I cannot qualify in all of the good things which your chairman has said about me. I am glad to be from Michigan. I assure you I am greatly interested in the work of this association. I admire immensely the perseverence of the members of this association. I am not to any extent a nut grower although I have nuts planted in my garden and hope that my heirs will reap the fruit of my trees. I went into the business rather too late. I have been so busy all my life that I did not have time to do some things. But I am very greatly interested in increasing the consumption of nuts. I have been popularizing the idea of nut consumption and making it a staple article of food for almost fifty years, and I have been continually faced with this objection that if we get all the people eating nuts there would not be enough nuts for them to eat. That is really the situation. There is not much use to increase the demand for a thing unless we can supply the demand. So I am very much interested in the production of nuts.

NUTS NEEDED AS SUPPLEMENTARY FOODS

Dr. J. H. Kellogg, Battle Creek, Michigan

The nut is the oldest and best of Nature's products intended as food for man. The paleontologists tell us that early man was a nut eater as are the gorilla, the orang-ou-tang, and the chimpanzee, his modern prototypes.

Elliot, an eminent English anthropologist, tells us in his interesting volume, "Prehistoric Man," that "there was not, so far as we are aware, any carnivorous creature in the Eocene period."

Elliot also tells us that walnuts, almonds and palm nuts were produced in great quantities in the forests of the ancient world contemporaneously with the lemur-monkey man, who had then made his appearance in what is now northeastern North America, the first land to rise out of the ancient ocean. From the facts set forth by Elliot showing that all the higher mammals were originally vegetable feeders, as well as from his biological affinities with the anthropoids with which man forms the family of primates, it is evident that man is so constituted that he may if he chooses, select his entire bill of fare from the vegetable kingdom. That this may be done successfully, that is, that a man may live on a diet, no part of which is drawn from the animal kingdom, has been abundantly proven. The experience of many millions of human beings in India and other Oriental countries who abstain from the use of flesh on religious grounds, and to whom cow's milk is almost a novelty, is a practical demonstration of the fact that the vegetable kingdom is able to supply to human beings everything required for complete nutrition.

It is true that some years ago Slonaker, of Leland Stanford University, in an animal feeding experiment in which one group of rats was fed a mixed diet and the other exclusively on food stuffs of vegetable origin, found that his vegetable feeding rats, although for a few weeks showing themselves superior to the mixed feeders later developed unmistakable evidence of malnutrition and physical inferiority.

Some years later, however, McCollum of Johns Hopkins, then of Wisconsin University, demonstrated conclusively that by making a proper selection of vegetable foodstuffs, rats may live and thrive indefinitely on a diet wholly derived from the vegetable kingdom. In connection with this and other similar experiments, McCollum made the interesting discovery that when an animal's bill of fare is to be wholly drawn from the products of plant life it is necessary, in order that the animal shall be fully nourished, that all parts of the plant should be eaten. His experiments demonstrated that if animals are fed upon seeds, alone they undergo physical depreciation, do not obtain full growth, are unable to reproduce or nourish their kind, and ultimately perish. In like manner, roots are found to be incapable of bringing an animal to full development and sustaining its life indefiitely. It was found that to be well nourished the animal must eat in suitable proportions, variable within considerable limits, seeds or fruits and leaves. The great importance of the green leaf as a complement of other foods has been clearly shown.

Experiments by McCollum, as well as those of Osborne, Mendel, and numerous other investigators in the same line of research, have made clear several new and highly important facts in the physiology of feeding.

They find that foods contain certain subtle elements known as vitamines which are absolutely essential to the full development and prolonged life of an animal. These elements are not found equally distributed in the parts of plants and animals. In seeds they are found chiefly in the outer layers or envelope which is commonly rejected as bran. A certain vitamine especially concerned with growth and development, the fat soluble B, is found in the green leaf along with lime and iron, all of which are deficient in seeds. Roots especially supply an abundance of alkaline salts which are highly necessary to balance up an excess of mineral acids found in seeds.

Ignorance respecting these highly important facts has been responsible for a great number of failures in attempts to adopt a non-flesh dietary. A diet consisting of cereals and fruits, as for example a bread and fruit diet, while apparently satisfactory for a brief period, must inevitably result in failure because of lack of lime, iron and special vitamines found in the green leaf. The same deficiency exists in flesh foods. The soft parts of an animal, fat and lean meat, are almost wholly lacking in lime and vitamines. They contain a great excess of mineral acids. Even a carnivorous animal fed on such a diet soon shows evidence of failure. The lime in the animal body is found almost wholly in the bones, and the vitamines are concentrated in the liver and other glands, so that in the case of flesh foods, as well as vegetable foods, for complete nutrition it is necessary that the whole animal or its essential parts should be eaten. Wild carnivorous animals do this as do also wild men who live largely upon flesh foods. The cave men crushed and ate the bones of the animals upon which they fed, and the Indian tribes of Texas and the Northwest have long practiced the grinding up of the bones of fishes to eat with their food.

Dr. Treves, one of London's most eminent surgeons was called upon by the head keeper of the animals of the London Zoological garden for advice respecting the condition of the lions. It was noted that the cubs bred in captivity were club-footed and variously deformed, and in many cases were either born dead or survived but a few weeks. His investigation showed that the fault was wholly in the diet. The lions received only the soft parts, lean and fat, of animals. When given bones and bone meal the difficulty speedily disappeared. Stefansson reports that, when living upon an Eskimo diet it is necessary to take the whole bill of fare, including the raw frozen liver of the seal, otherwise serious illness intervenes.

Hindhede, by arranging a dietary based upon these principles, has demonstrated that a man may be perfectly sustained on a diet which contains no animal product of any sort. In a letter received by the writer from this able Danish physiologist, the statement is made that a strong laboring man was maintained for 23 months in perfect health and vigor on a diet into which no animal products entered.

Another important fact developed by Rubner, Mendel, McCollum and other investigators which is of fundamental importance in animal nutrition, is that proteins differ in their value as tissue builders. Proteins differ from the starches and fats in the great complexity of their composition. Instead of being simple compounds or mixtures of a few simple compounds, proteins, as found in nature, consist of several sorts of highly complex molecules which vary greatly in their composition.

The protein molecule is made up of a number of organic units known as amino acids. There are 30 or 40 different kinds of amino acids of which less than 20 enter into the formation of the proteins of the human body. These 18 or 20 different amino acids are absolutely essential for the formation of body proteins, and are produced by plants, hence if they are not found in the food the body cannot produce them and the material necessary for tissue building or repair will be lacking.

Proteins which contain all the amino acids essential for tissue building are known as complete proteins. Other proteins, lacking in certain essential constituents, are designated as incomplete. Flesh foods necessarily furnish complete proteins. The proteins of milk and eggs are also complete proteins. The proteins met in the vegetable world are exceedingly varied in character. Each species of plant produces its own kind of proteins. Vegetable proteins differ greatly among themselves. Complete proteins are comparatively rare. The proteins of cereals, for example, have been shown to be deficient in some of the essential amino acids. Th deficiency is still greater in the proteins of beans. In fact, the proteins of vegetable foods in general may be said to be deficient.

The necessity for providing the body with complete proteins was doubtless the original cause which led men under circumstances of privation and emergency to resort to the use of animal flesh for food. The cows of Nantucket, the ponies of Alaska, and I have recently been informed by Mr. Goddard, curator of anthropology in the American Museum of Natural History, the rabbits of northern Canada, in times of great scarcity of food, also resort to the eating of flesh. The necessity for complete protein to maintain physical fitness is so great that animals by nature the farthest removed from the carnivorous class resort to flesh eating when this is the only source of the needed element.

But what bearing has all this upon the dietetic use of nuts? The relation is very direct and very important. The situation developed as a result of the World War made very clear to everybody how close the world has arrived to the point where the careful economizing of our food resources will be absolutely necessary. The rapid increase of the world's population which has occurred, especially within the last two centuries, is a new world experience. Two hundred years ago the average length of human life was less than 20 years, as it still is in Mexico and some other parts of the world where the life-saving influence of modern sanitation and health conservation have not had an opportunity to exercise their influence. In former times great epidemics devastated whole continents so frequently that the world's population barely held its own from century to century. In many instances whole tribes were wiped out. Such catastrophes are now almost unknown, although we still have with us the plagues of influenza, tuberculosis, syphilis, and pneumonia. Even these, however, are being conquered, so that their destructive influence is being stayed.

At the present rate at which the population of the world is increasing, the time is certainly not far distant when it will be necessary to utilize in the most economical manner possible every acre of soil capable of producing food. During the war the attention of agriculturists was very forcibly called to the enormous waste involved in our so-called animal industry. The first measure of food economy adopted in Germany at the beginning of the war was the slaughter of a large part of livestock. The same measure was adopted in Scandinavian countries and in all parts of central Europe. This was absolutely necessary, as Lusk and numerous other authorities have shown, for the reason that to produce one pound of water-free food in the form of beef or mutton requires the consumption more than 30 pounds of digestible food material. The cow is a much more economical means of food transformation, requiring the consumption of only a little more than 5 pounds of food for each pound produced, so that the waste of food in the production of milk is less than one-fifth as much as in the production of meat. This has led the food economists to recommend the reduced use of meat and the increased use of milk as a source of the complete protein required for sound nutrition. McCollum and other authorities, including representatives of the United States Department of Agriculture, have within the last four years persistently urged upon the public the importance of using more milk and less meat, and not simply as a matter of economy but as a matter of health as well, for it has been shown that the protein of milk is even superior to that of meat. It was found, indeed, that by the use of a few ounces of milk daily, a pint and a half, in connection with a dietary otherwise consisting wholly of foods derived from the vegetable kingdom, the body will be amply supplied with complete proteins, the milk not only furnishing protein of a superior character but serving also to supplement the proteins of the cereals, roots and other vegetable foods, supplying the amino-acids which they lack so as to render them also available for tissue growth and reconstruction.

This discovery respecting the important place which milk is capable of filling in the solution of the great and pressing problem of human nutrition is a highly important one, and its value has led to very active efforts on the part of the U. S. Department of Agriculture to enlarge the dairy interests and increase the milk production of the country as one of the best means of food economy which could be adopted. But even this is not a complete solution of the difficulty, for the keeping of milch cattle involves still a very large waste of food material, five pounds being consumed by the cow for each pound produced. The evident reason for this is the fact that the cow requires the large part of the foods she eats for her own use in maintaining heat production, supplying energy for exercise, supporting the work of the heart, lungs, digestive organs, etc. The food value of the milk produced represents simply what is left over after the cow has made use of what she needs for herself.

There can be no doubt that as meat production diminishes, as it is certain to do, milk production will likewise decrease. There is even at the present time a notable shortage of dairy products, and the average per capita production will undoubtedly continue to decrease for the same causes which inevitably lead to a lessened meat production. Some other source for the complete proteins needed to supplement the incomplete proteins of cereals and roots must be provided. Fortunately, Nature has supplied us with this all-essential foodstuff in that choicest of all our products, the nut. This is a vitally important fact which sometime will save the race from protein starvation.

A study of the relative protein content of nuts, milk, and meat shows that, pound for pound, the almond, beech nut and walnut contain on an average as much protein as does meat and five times as much as is found in milk, and protein which from rat feeding experiments appears to be of equal value. The chestnut, the chinquapin, the filbert, the hickory, pecan and pine nut contain on an average as much protein as is found in fish, while the butternut, the peanut and the pignolia contain twice as much or 50 per cent more than is found in the best of meat.

The following table shows the number of pints of milk equaled by one pound each of the several nuts mentioned, together with the calory value of the nuts per pound and of the amount of milk containing an equivalent amount of protein and the amount of each kind of nuts needed to supply supplementary proteins for one day:

	Pints of Milk containing as much protein as one pound	Calories Milk	Calories Nuts	Amt. needed for one day
Acorn	2.4	780	2620	8.3
Almond	6.4	2080	3030	3.2
Beech nut	6.6	2145	3075	3.0
Butternut	8.5	2762	3165	2.4
Chestnut	3.2	1040	1876	6.4
Chinquapin	3.3	1072	1800	6.4
Filbert or Hazelnut	5.0	1625	3290	4.0
Hickory nut	4.6	1495	3345	4.8
Pecan	3.6	1170	3455	5.6
Peanut	9.2	2090	2600	2.2
Pinon	4.4	1430	3205	4.8
English walnut	5.4	1555	3300	3.7
Black walnut	8.5	2762	3105	2.4

From animal feeding experiments it has been determined that about 20 oz. of milk will furnish sufficient complete protein to supplement a vegetable diet otherwise deficient in complete proteins. This amount of milk will supply one-third to one-half the total daily protein requirement for the average person. Nuts are so rich in these precious proteins, practically identical with those of milk, that the protein found in 20 ounces of milk may be furnished by 2 ounces of peanuts, 2 1/2 ounces of butternuts, 3 ounces of almonds or beechnuts, 4 ounces of English walnuts, or filberts, 5 ounces of pinenuts (pinons) or hickory nuts, 5 1/2 ounces of pecans, 6 1/2 ounces of chestnuts or chinquapins, or half a pound of acorns.

The nut is one of the most important and interesting of all foodstuffs for the reason that it presents in concentrated form the most valuable and easily digestible of proteins. It is for this reason that the farmers of Northern Ntaly are able to thrive on a diet of which the chestnut is the staple. For the same reason 300,000 Pacific Coast Indians prospered for centuries on a diet consisting chiefly of acorns and pinenuts. In recent times, one of these Indians was known to be living at the age of nearly 140 years, and the farmers of the West and South before they had destroyed with axe and fire the splendid oak forests of pioneer days, depended chiefly on mast to fatten their hogs. The acorn was their chief source of protein, which is as necessary for a hog as for a college professor.

From the standpoint of cost, nuts, even at the present extraordinary prices, compare favorably with milk as a source of protein, because of the small quantity required to furnish the needed supplement of complete proteins. For example, shelled almonds, at a cost of $1.00 a pound (retail) supply for 19.2 cents the same amount of supplementary protein furnished by milk at a cost of 24 cents. Black walnuts supply the same amount for 15 cents, pine nuts (pinons) for 20 cents, hickory nuts 15 cents, and peanuts 4 cents.

The late Dr. Austin Flint more than fifty years ago prepared from almonds a milk for use by certain classes of patients. The writer, about thirty years ago, prepared from the peanut and other nuts a preparation known as malted nuts which much resembles malted milk in appearance and flavor, and which has been successfully used in place of milk by persons sensitized to cow's milk in hundreds of cases.

The preparation of milk substitutes from vegetable sources is not a new idea. When in Russia a few years ago, I found on sale in delicatessen shops a paste prepared from honey and almonds which with the addition of water made a very palatable emulsion much resembling milk in appearance as well as in flavor. I have been informed that the natives of the Philippines prepare from the litchi nut a vegetable milk for feeding infants deprived of their natural nourishment. These natural products have the advantage over the infant foods of commerce most of which are better fitted to destroy than to preserve life. They are complete foods, supplying the essential vitamines as well as other necessary elements.

The nut is not only the most concentrated form of nourishment known, but, contrary to the general view, is one of the most easily digestible. The supposed indigestibility of the nut is due to two things, eating when already satiated with food; that is, taking the nut as a surplus food, and second, neglecting to masticate the nuts thoroughly. Watch a monkey eating nuts and see how thoroughly he masticates each particle. Any particle not well crushed and emulsified is passed through the intestinal canal undigested and of course unabsorbed. But when crushed and converted into a smooth cream, the nut is one of the most easily digestible of all foods. Most nuts consist almost exclusively of two food principles, proteins and fats. The protein is one of the finest sort and more easily digestible in the raw state than is cooked protein of any kind. The fat is finely emulsified, and thus prepared for prompt digestion and absorption.

Experiments on human subjects conducted at the Battle Creek Sanitarius by an expert from the laboratory of Yale University, showed that the proteins of nuts are as easily digested and as fully utilized as the proteins of other foodstuffs.

The peanut produces an average crop of at least 40 bushels, or 900 pounds of shelled nuts to the acre, equivalent to 8,280 pounds of cow's milk, to produce which would require 4.6 acres. A grove of black walnuts, 40 trees to the acre, producing one hundred pounds of nuts to the tree, or one thousand to the acre, would afford as much protein as 8,500 pounds of milk, to produce which would require 5.3 acres. It it is to be noted, also, that one pound of peanuts has a nutritive value nearly one-third greater than that of the 9.2 pints of milk containing an equivalent amount of protein, while the calory content of the one pound of nuts is more than ten per cent greater than that of the milk furnishing the same amount of protein. In the case of many nuts the disproportion is greater. For example, one pound of filberts has a food value double that of an amount of milk containing the same amount of protein.

The nut is evidently superior to milk as a source of protein. Like milk, nuts are rich in lime, doubtless due to the high protein content with which the lime is associated in vegetable products. Nuts, like milk, are deficient in iron, although in this respect they are considerably superior to milk. Hence when nuts are freely used as a source of protein care should be taken to supplement them by a liberal quantity of greens, which are rich in iron and lime as well as in the fat soluble vitamine which is also found in abundance in milk but in which nuts are rather deficient.

It thus appears that nuts, because of the superior quality of their protein, may not only take the place of meat in the dietary, but when properly combined with other vegetable foods, may to a large extent, at least, take the place of milk. In this respect they constitute a unique class of foodstuffs.

The soy bean, which like the peanut is a legume rather than a true nut, resembles the peanut in composition and like it affords a protein of a quality so closely resembling that of milk that a very excellent milk has been prepared from it. Its protein is also complete in character and may replace the protein of meat. The soy bean has, in fact, for many thousands of years been the chief source of complete proteins for the Chinese and the Japanese.

Aside from the soy bean and the peanut, nuts have no rivals in the vegetable kingdom. They are real plant aristocrats, the value of which will be more and more appreciated as scientific research and practical dietetic experience make clear their numerous points of superiority.

The meat industry and the milk supply are so closely related that both are influenced by the same causes. Both meat and milk are certain to become scarcer and more costly. And while it is most desirable that milk should continue to constitute a part of the human bill of fare and that its use should be encouraged and if possible increased, it is certain vegetable substitutes for both meat and milk will be increasingly in demand as pasture lands shrink in area and the world's population and consequent demand for food cereals increase.

It is certainly greatly to be desired that such efforts should be put forward to convince members of congress and of state legislatures of the importance of nut culture as will induce them to institute efficient measures for encouraging the wide spread culture of nut trees and thus make provision in time for the pressing need of the superfine material afforded by them which coming years will certainly develop, for it cannot be doubted that as the earth's population increases and as the science of nutrition is perfected, we shall return more and more to the dietary of primitive man, in which nuts were the chief staple, with fruits, succulent roots and tender shoots as supplementary foods for bulk, vitamines and food salts.

The Secretary-Treasurer: I have been asked to prepare a paper on the "Propagated Hickories." I have passed around a printed slip giving the results of tests of some hickory nuts which will be useful in connection with the paper.

PROPAGATED HICKORIES

Willard G. Bixby, Baldwin, Nassau Co., N. Y.

The title of this paper is a little misleading. In the nut contests the word "propagated" is restricted to those nuts which any nurseryman lists in his catalog and of which he is prepared to furnish grafted, budded or otherwise asexually multiplied trees. There are few hickories which are "propagated" in this sense and perhaps a better title would be "What We Know About the Hickories That Are Propagated Experimentally."

In a paper which Dr. Morris is to deliver he will tell us about top working hickory trees. This is a matter of great interest for top workworking existing trees is the method which at the present time promises to be the means of getting our first orchards of fine hickories in bearing condition.

The earliest instance of which we know anything of grafted hickories is that of the Elliot hickory owned by the late Whitney Eliot, of North Haven, Conn. This was awarded a prize offered by the late A. J. Coe of Meriden, Conn., for the best hickory nut exhibited at the December meeting of the Connecticut Agricultural Society in 1892. According to the Bulletin of the U. S. Dept. of Agriculture on "Nut Culture in the U. S.," 1896, this was the product of a grafted tree. I have never seen a specimen of the nut although I understand that the tree is still standing. I have been unable to get any definite information as to when the grafting was done, methods used, etc.

The next instance of successful hickory grafting and the one which is best known is the work of the late Henry Hales of Ridgewood, N. J. When he purchased his place some fifty years ago, he found on it a fine shagbark hickory tree. This had been standing longer than the oldest inhabitant could remember and it is supposed to have been one of the original forest trees of that section and spared on account of the excellent nuts it bore. It came to the attention of the late Andrew S. Fuller, author of the "Nut Culturist" published in 1896, and was described by him in 1870 in the Rural New Yorker. Shortly after this description, Mr. Hales received many requests for scions to which he generously responded and any propagator who thought he could propagate this hickory was given a chance to try, the conditions being that one-half of the successfully grafted trees should belong to Mr. Hales in payment for the scions sent. During the next ten years orders for scions were so numerous that the old tree was kept pretty well pruned. Mr. Hales received during the period only about two dozen trees from the thousands of scions which he sent out. According to Fuller's "Nut Culturist" these were largely grafted by Mr. J. R. Trumpey of Flushing, N. Y., now a part of New York City. Information which I received at the Hales place was that the trees growing there were grafted by Jackson Dawson of the Arnold Arboretum about 1891. Inasmuch as there appear to be trees of two different ages there it is probable that some trees were from one propagator and some from the other. The trees grafted by Jackson Dawson we know were on bitternut root and it seems likely that the others were also for one tree is not like the others and I was informed that that was a grafted tree, but the graft died and a shoot came out at the base of the graft which was thought to be from the graft but, after the tree had grown it became evident that it was not. The buds of this tree show evidence of the bitternut. The nuts, however are not pure bitternut and the tree is seemingly a bitternut x shagbark hybrid. All of the trees grafted by Jackson Dawson were bench grafted in the greenhouse on especially grown stocks. I have two trees on my place from Thomas Meehan & Sons, Germantown, Pa., propagated in the same way and, when received, the long tap roots were coiled up like springs showing that the trees had been grown in pots. These trees, however, have grown well since I planted them out though they were very small and feeble when set out. These grafted Hales trees at the Hales place bore nuts in eighteen to twenty years after grafting. They bore for about five years and then ceased bearing. I went to see them for the reason that I was informed by Miss Hales that the trees were not looking satisfactorily and she was afraid there was some disease on them. I requested the U. S. Dept. of Agriculture to allow Mr. S. M. McMurran, who has made a study of pecan rosette, to come and look at the trees for it seemed to me that they were similarly affected. He took specimens of the leaves and reported that he could find no evidence of insect or fungus trouble. He also made a careful examination of the soil, and the farm was gone over carefully looking at the pecan and hickory trees growing there of which there are a large number. Most of these did not seem to be in good condition although a few did. Tests made of the soil seemed to show that it was not the kind of soil in which hickories and pecans do their best. It was also ascertained that while Mr. Hales senior was living the trees had received an application of manure every year. Since his death they have not. This, in connection with the poorness of the soil for hickories, seems possible may be the reason for the cessation of bearing. It also seems likely that bitternut root is not a good stock for the shagbark. I have on my place two grafted Cedarapids trees, each of which when received was four years from the graft and four feet in height above the graft. One was on bitternut stock and one on shagbark. The one on shagbark stock had made about six inches the first year, a foot the second year, a foot and a half the third and two feet the fourth while in the case of the one on bitternut root the growths were reversed, two feet the first, a foot and a half the second year, a foot the third year and six inches the fourth year. Mr. Jones has also had the experience of grafting the Vest hickory on the bitternut, had it bear in two years, and then die. While the evidence we have on this subpect is not conclusive as there may have been other factors which might have caused the trouble outside of the stock, it shows that the stock on which the different hickories are to be grafted is a matter of importance. Mr. Henry Hicks of Westbury, L. I., who a number of years ago became enthusiastic on the Hales hickory, has four grafted trees or those which he purchased for grafted on his place. One he has had twenty seven years and it has not borne. It has been twice transplanted. He has two or three others which have not yet borne. Inasmuch as the buds of these trees are not all alike, it is very evident that they cannot all have been grafted from the original Hales tree. The finest looking Hales hickory of which I know is on the place of Frederick E. Willets, Glen Cove, L. I. Mr. Willets could not tell me how many years it had been set out but it was quite a good many. It bears a few nuts but the tree has been disappointing in its performance. I examined it during the past summer and the nuts, of which there were not many on the tree, were dropping off. It was evident that some insect was attacking the husks which may account for the rather unsatisfactory bearing record.

In distinction from this rather unsatisfactory record of Hales trees we have great promise of something worth while in the only other bearing grafted transplanted hickory of which I can give information, Mr. Rush's Weiker tree. This was produced by Mr. J. F. Jones when he was living in Monticello, Fla. A southern pecan nut was planted in 1902. It was root grafted below the surface of the ground in 1903, sent to Mr. Rush in the spring of 1904 and planted out at that time.

Mr. Jones says that the tree was not over eight inches high when sent. It bore its first nuts in 1917 and has borne a few every year since. This year the tree set full and had a good crop when I saw it last. The nuts borne by this tree are considerably larger than those of the parent Weiker tree. Inasmuch as the original Weiker tree has given us our best hickory bearing record, it seems not unlikely that this grafted Weiker tree may also be an unusually good bearer.

Against this slow record of grafted transplanted hickory trees, we have some remarkably quick results with top worked hickory trees. Mr. Jones has a bitternut tree now about five inches in diameter which was top worked in the spring of 1916 to Fairbanks variety, ten grafts being put in, two of which blew out that summer or fall and were replaced the next spring. In 1919 all the grafts, the two year ones as well as the three year ones bore nuts, about 120 maturing. The tree set full of nuts in 1920, but caterpillers got on it, unnoted, and practically the entire crop dropped off. Mr. Jones also has a smaller bitternut tree top worked at the same time to Siers. It bore two nuts in 1919. He also has a mockernut tree top worked at the same time with Kirtland and which set some nuts in 1919 but which dropped off before maturity. It set quits a number in 1920. Mr. D. C. Snyder, Center Point, Iowa, has a shagbark hickory some twenty-five or thirty years old which was top worked shortly after it had begun to bear. In 1913 the four top limbs were top worked to Fairbanks hickory, the rest of the tree being undisturbed. In 1915 these grafts bore nuts and have borne every year since. In 1919 they bore two quarts. Inasmuch as this was a year when the hickory crop in that section was a failure it was thought to speak well for the bearing of the Fairbanks hickory. In 1916 four grafts of Dennis hickory were put in and three of Cedar Rapids. The Dennis grafts bore four nuts in 1918 and over a dozen in 1919. The Cedarapids bore one dozen in 1919 besides a number more which a squirrel got before Mr. Snyder did. Mr. William A. Baker of Wolcott, N. Y., top worked a bitternut tree to Fairbanks in 1917 and the tree bore ten nuts in 1919. Mr. Harvey Losee, Upper Red Hook, N. Y., grafted the young shoots of cut back hickories and out of three shoots so grafted had them bear in three, four and five years respectively. Dr. Morris has grafted a Taylor hickory on a small tree which bore five years after gafting. Dr. Deming on his place at Georgetown, Conn., has probably a greater collection of top worked hickories of various varieties than anybody else. These trees are growing finely and give promise of bearing early. A Taylor hickory on stock 1 1/4″ diameter grafted, April 26, 1918 had ten nuts on it on June 27, 1920. A Griffin hickory grafted in 1915 which is now 2 1/2″ in diameter had 31 nuts on it on the same date. There seems to be no question but that anyone who has land with hickory trees one to four inches in diameter can easily and quickly change them into orchards of hickories bearing fine nuts by top working.

We next come to the relative merit of the various hickories of which we know. I was fortunate in securing for the 1919 contest enough specimens of the greater portion of those hickories which have been propagated experimentally to a considerable extent so that some information on this point can be given. The printed slip which I will pass around gives the results of these tests and will give a better idea of the different nuts than can be done in any way except by passing around samples. It will be noted from the slip that the nuts run very close indeed and it is very probable that another year these nuts would not show exactly the same results for it has been clearly shown that nuts vary greatly from year to year. There are other characteristics of hickory nuts which are of great importance which are not shown in the annual contests. These are the bearing records of the tree, its ability to stand various diseases and most of all how it will work out when grown in orchard form. This can only be told by experience. From the fact that, in the 1919 contest, of the ten varieties of the experimentally propagated hickories there was only a difference of five points between the highest and the lowest, it shows that the merit of each nut is sufficient so that all of these should be tested out in orchard form. In other words we should not for example select the Vest and Manahan as the best that we have and propagate them to the exclusion of the others. It is probable that there will be great differences in the orchard behavior of these various hickories shown as this is done and that then we shall be able to select the most desirable varieties. Some tests made recently on nine standard southern pecans the Schley, Burkett, Moore, Alley, Delmas, Moneymaker, Pabst, Stuart and Vandeman show a great difference between the highest and lowest in the number of points awarded, this difference being 10 points as against 5 in the case of the hickories. The Hatch bitternut and Stanley shellbark noted on this slip are here not because it is believed that, as market nuts, they will compare with the first ten mentioned but because they are the best nuts we now have which are not shagbarks or of which the shagbark is not one parent. It is believed that these nuts will be valuable for hybridizing purposes.

There is one matter suggested by the slip on which I will touch although it is not properly within the scope of the subject set for this paper and that is the possibilities of hickory breeding. Of the ten hickories noted on the slip as receiving 70 to 75 points, four, it is agreed, are hybrids. The examination which I have made of the others leads me to believe that more of them are, but four out of ten with the possibility of more is sufficient to cause us to take notice. There are some nine hickory species native in the north eastern United States and they hybridize to a considerable extent. Some of these species show most remarkable differences in characteristics. The shagbark is unexcelled for quality of kernel. The shellbark bears nuts as large as the largest black walnut. The bitternut bears nuts with a thinner shell than any of the finest southern pecans and with a larger proportion of kernel. What we know about practical plant hybridization leads us to believe that we can combine the good qualities of these various species of hickories. Think of what it would mean to have hickories equal in quality of kernel to the best shagbark, of the size of the largest black walnut with a shell thinner than the thinnest shelled pecan we have ever seen, and with a larger proportion of kernel.

While the hickory is the nut which has given us the most trouble in propagation and gives us the most trouble in transplanting and grows the slowest, it is certainly difficult to find one which gives more promise either in growing the fine hickories we now have or in breeding up better ones. I am convinced that as soon as we can furnish the fine hickories we now have in commercial quantities they will command prices equal to those paid for the finest pecans.

The President: I will call upon Mr. J. F. Jones, of Lancaster, Pennsylvania, who has the subject of "Selecting and Handling Scions."

SELECTING AND HANDLING SCIONS

J. F. Jones, Nut Specialist, Lancaster, Pennsylvania

In the selection of scions of nut trees for grafting the propagator should keep in mind the fact that the wood selected must be full of vitality and must be of solid, well matured growth, that will stand the maximum amount of exposure and hardship after being grafted, as the grafts and stocks of nut trees callous or heal very slowly in comparison to fruit trees, and the scions must be of solid, well matured growth if good results are to be obtained. These requirements usually go together however and if we select scions of solid, well matured growth, we usually get scions in which the tree has stored the maximum amount of "starch" or vitality.

How to Judge Scions

The experienced propagator of nut trees can quickly distinguish between good and poor scions for grafting, but the beginner, not knowign the ear marks of good scions, often fails to select the best scions for grafting. The common mistake made by the beginner in the selection of scions of nut trees, is in selecting the smaller growth. The smaller growth is usually more pithy and lacking in vitality and gives poor results in grafting. Poor scions are usually characterized by pithy wood and a light colored, thin bark. The buds are usually farther apart than they are on good scion wood, though this is not always true, as good scions sometimes have the buds set well apart, except near the terminals. The distinguishing marks of good scions are solid, well matured growth, and a thick, dark colored bark. The buds are also larger and usually set closer together.

When to Cut Scions

Scions must be cut while the tree is still dormant and, in the case of trees that the wounds bleed when the tree is cut, as do the English and Japan walnuts, under certain conditions, we must guard against cutting scions soon after severe freezing weather and before the tree has fully recuperated. This semi-sappy condition of the trees following low temperatures that freeze the wood, seems to be a provision of nature to restore the moisture or sap lost from evaporation, and although more noticeable in some species of trees, notably the English walnut, this condition undoubtedly exists in other species of trees to a greater or less extent and we always try to avoid cutting scions of any kind soon after hard, freezing weather. I have found scions of the English and

Japan walnts, cut from trees in this condition, to be practically worthless for propagation, although the scions may have been cut in late winter, long before the sap gets up in the tree naturally.

Handling and Keeping Scions

Scions of nut trees for grafting should be handled carefully to avoid rubbing off the buds, although this is not so important with nut trees as with fruit trees, for the reason that the more important nut trees such as the various walnuts, pecan and hickories have compound buds and if the larger buds should be destroyed the secondary buds may be counted upon to grow. The scions should be tied in bunches of a convenient size to handle and, after being well tied and carefully labeled, should be packed in paper lined boxes that will prevent evaporation of moisture in the packing material. Any material that will absorb and hold moisture and that will not heat when bulked, will answer the purpose for packing scions, but we have found sphagnum moss to be the best material for this purpose. This material can be obtained from the local florists or dealers in cut flowers usually. Sphagnum will absorb a good deal of moisture without actually becoming wet and will also hold this moisture and give it off more slowly than any other packing material with which I am familiar. This is especially important in keeping scions of nut trees in good condition for grafting, because, if packed too damp, the scions are soon spoiled for grafting, even if kept at a low temperature.

As a precaution against fungi, we usually use bordeaux mixture, two thirds standard strength, to dampen moss for packing scions, especially if they are to remain in storage several months.

Our rule is to use moss only slightly damp to the touch and if used in sufficient quantity, say two or three times as much bulk as we have of scions, we find no trouble in keeping scions in perfect condition for months. In fact, as an experiment, we have carried pecan scions in cold storage and without re-packing for fifteen months and then get a fair stand of grafts to grow.

We usually advise putting scions in cold storage where convenient, especially if they are for use in late May or June, but this is not at all necessary if the scions are packed in moss only slightly damp. In fact scions kept in an ordinary cellar at a temperature around 50 degrees have given us better results on the average the past two years than have those from cold storage.

The association adjourned until 2 p. m.

AFTERNOON SESSION, FRIDAY, OCTOBER 8, 1920, 2 P. M.

THE PRESIDENT: We very fortunately have with us a gentleman from the Bureau of Entomology, Mr. F. E. Brooks, who will talk to us about nut insects for a time and we will be very glad to listen to him.

MR. BROOKS: I believe your program is full for this afternoon and I shall keep you but a few minutes.

A little more than a year ago the problem of insects affecting the nut crop of Northern United States was assigned to me by the Bureau of Entomology. I wish to say the work has been very delightful to me from several standpoints. In the first place, it has brought me into association with a delightful group of workers. I want to express to you the pleasure I have had in meeting the various nut growers of the northern part of this country and noting the hearty way in which they are ready to co-operate in solving the nut insect problems. The field of work is interesting because there appear to be in sight no insect pests that promise to embarrass or overwhelm the nut grower. We have a few quite serious insect problems, perhaps none more serious than that occasioned by our old acquaintance, the "chestnut worm." That problem, however, is being solved rapidly in many localities by the chestnut blight.

Thus far in the work, I have devoted most of my time to a study of the species attacking the fruit of nut trees, and I may mention three groups that have been given special consideration. First, the group to which the chestnut worm, or chestnut weevil, belongs. There are two very similar species of these weevils which attack chestnuts, one which attacks hickory nuts and pecans, one which attacks hazel nuts and numerous species which attack acorns. The adults of these weevils are medium-sized beetles, yellow, brown or gray in color, and all have enormously long snouts. The mouth is located at the point of the snout and the beetles use these snouts to bore through the covering of the nuts after the kernel is partially or fully formed. When the puncture into the nut is completed one or more eggs are inserted by means of an extensile, thread-like tube, or ovipositor, of the same length as the snout. The eggs hatch into the familiar worms found in ripe chestnuts, hickorynuts and hazel nuts. The large hole in the shell of the nut is made by the full grown worm as it escapes to enter the ground, where it completes its transformation into a beetle. An interesting thing in connection with these weevils is that each species confine its attacks to one particular kind of nut. Even those species that attack acorns show a decided tendency to distinguish between oak species and confine themselves as groups very largely to particular species or botanical groups of oaks. There is, therefore, no danger that any of these weevils will multiply, for example in an oak forest, and then migrate into nearby plantations of chestnut, hickory or hazel. Hazels might be used for interplanting among chestnut or hickory trees with no danger that the hazel nuts would become infested by the weevils that develop in the chestnuts or hickory nuts. This habit of the weevils is greatly to the advantage of the person who would plant a particular kind of nut outside its natural range, or at a considerable distance from any other trees of its kind. He could do so with reasonable assurance that the weevil attacking his species of nut would not occur upon his trees until brought into the locality by artificial means.

There is another group of weevils, nearly related to the common plum curculio, the species of which attack inmature nuts. In this group the snout is much shorter than in the group just described, and the insects are considerably smaller. There is one species, *Conotrachelus juglandis,* that confines its attacks to the young fruits and shoots of walnuts of the butternut group, another, *Conotrachelus retentus,,* that seems to attack exclusively the black walnut fruits from the time they set until they are half grown, still another, *Conotrachelus affinis,* that appears to attack only half-grown hickory nuts. Another species, *Conotrachelus aratus,* feeds abundantly in some localities within the leaf petioles of hickory. At least two other species of the group commonly attack acorns. Those injuring walnuts lay their eggs on the concave side of crescent-shaped punctures which they eat in the husks of the young nuts. The larvae developing from the eggs cause the nuts to drop within a few weeks and the larvae enter the ground to complete their transformation. There is a devided tendency with some of these species to attack the young wood and leaf stems of the introduced species of walnut. Dr. Morris state s that he has had young Japanese walnut trees killed by *C. juglandis* feeding in the grub stage within the branches. He has, however, found that the pest succumbs to an arsenate of lead spray.

Species of this group are apt to have alternating periods of increase and decrease and a year of great abundance may be followed by a year of comparative scarcity. This variation is due, at least in part, to the fact that the larvae, as they feed within the tissues of their host plants, often become rather heavily parasitized by certain two-winged and four-winged flies, the parasitized larvae dying before they reach the adult stage. Nature in this way does considerable toward holding the pests in check, but artificial means of control will often need to be considered.

The third group referred to is represented by a two-winged fly, about the size of the common house fly, known technically as *Rhagoletis suavis,* and commonly as the walnut husk-maggot. The fly is light brown in color, with broad, irregular, dark brown bands on the wings. It appears when walnuts are nearly grown and deposits clusters of small, white eggs within punctures in the husks. Maggots hatch from the eggs and at the time the walnuts drop these maggots are often found converting the inner parts of the husk into a blackened, pulpy mass. Infested nuts are disagreeable to handle and the husk does not part readily from the shell. I have found the fly attacking black walnuts, butternuts, Persian walnuts and Japanese walnuts, within the states of West Virginia, Maryland, Pennsylvania, Ohio, New York, Connecticut and Massachusetts. It probably occurs over the natural range of the black walnut and butternut. It is proving to be a rather serious pest, especially of the Persian walnut. Some of the infested walnuts appear to drop prematurely and others adhere to the branches beyond the regular harvest time. The shell of infested Persian walnuts parts poorly from the husk and the nut is discolored, soiled and unmarketable.

The fly has rather interesting habits. I found that by pricking a nearly mature black walnut with a pin, the wounds would almost invariably be used in a little while by the female flies for depositing their eggs. In one such wound, 180 eggs were laid within 24 hours. When the husk was pricked a slight flow of juice would take place and the male flies would soon find the spot, and, recognizing, I suppose, a suitable place for the females to come to oviposit, they would stand guard at the puncture awaiting the coming of the female. On one occasion I made minute punctures in the husk of eight black walnuts and in a little while a male fly was located at each puncture. Pairing took place usually as soon as the female came and began to lay eggs. Sometimes a male would be found at a puncture in the early morning and would hold its position against all coming males throughout the entire day. When another male would come to the nut the two flies would rear up facing each other and engage in a brief sparring bout with their front legs. Usually, the original occupant of the nut would be the victor. In some experimental spraying of Persian walnut trees in Maryland and Pennsylvania the past season with a sweetened arsenate of lead spray apparently good results were obtained. In one case it seemed that the spraying was about 75 per cent efficient in controlling the pest. In another case, whereas last year 7 5 nuts in 100 were infested, this year, after spraying only four nuts in 100 contained the maggots at harvest time.

I desire to state to the nut growers that I am interested in any nut insect problems that you may encounter and shall always be glad to receive reports and specimens. Your co-operation in this work is greatly appreciated and I hope we may continue to work together and that before long we may have more definite knowledge of the means of preventing, to some extent at least, the various forms of injury by insects to the nut crop.

Mr. Rush: I cannot help but express a word of gratitude and appreciation to my friend Mr. Brooks in helping me out of a serious difficulty that I had in connection with walnut culture at Lancaster. A year ago I was ready to throw up the sponge. In fact I might say that my whole crop last year was destroyed by this husk-maggot. This year I have a very fine crop. Last year it was practically worthless. This year I have very few walnuts that were affected by the maggots, largely owing to the successful spraying that he gave the trees at the proper time. I think the future has a bright prospect for making walnut culture more profitable.

The President: We are certainly under obligations for the very interesting talk and glad that Mr. Brooks could be with us.

The first thing on the program for the afternoon session, according to the published program, I know will be of a most interesting character, Top-Working Hickories, by Robert T. Morris.

TOP WORKING HICKORIES

Robert T. Morris, New York

At the prescent time when our views on the subject of top working trees are based upon incomplete knowledge and experience perhaps it is unwise to present a paper upon the subject which might be taken as authoritative. On the other hand my experience to date is worth recording for its face value, subject to change of view subsequently.

Different species of hickory act differently when subjected to top working methods. The bitternut may be cut back severely without giving evidence of any great degree of shock. The shagbark on the contrary makes slow recovery and many years are required for a cut-back shagbark hickory to regain normal equilibrium between top and root. The pignut and mockernut apparently stand midway between the bitternut and the shagbark in respect to the trimming of the top. My experience with shagbark includes the top working of trees ranging from a few inches in diameter up to fifteen or twenty inches in diameter, and the cutting back has included all stages from actual felling of the tree to cutting off half of the top or less than half of the top. The idea of felling trees completely was to graft stump sprouts or to insert the slot bark graft into the stump near the ground. When this has been done the larger hickories do not send up stump sprouts at all and the root dies excepting in cases in which a slot bark graft has been introduced. The graft grows slowly without a great degree of vigor and requires so many years for balancing the root that the method has not been practical up to the present time. The same statement is true of the shagbark hickory which has been trimmed back very severely leaving nothing but the stubs of large branches to be grafted immediately or for the purpose of grafting sprouts in the following year. The bark of the shagbark hickory is so hard that new shoots are choked severely and many years are required before they have a secure hold upon the stock. My final conclusion is that we may cut shagbark limbs having a diameter of three inches or less for the purpose of leaving grafting stubs. If a large number of grafts are inserted in such a topworked tree or in stock sprouts which start and are grafted in the following year the work is successful. In order to avoid the labor of topworking a large shagbark tree in its entirety we may graft only one or two limbs and allow stock sprouts to grow on other limbs until both stock sprouts and graft sprouts have become well branched. Branches carrying stock sprouts may then be removed a few at a time year after year, leaving the graft sprouts in charge finally.

By means of the bark slot method of grafting grafts may be inserted in any part of a hickory tree. The bank slot method consists in using a chisel and mallet for cutting parallel lines the width of the scion in the bark of the stock. The tongue of bark between the parallel lines is pried outward with the point of the chisel until the scion has been inserted next the wood and the tongue of bark is then allowed to return to place, leaving the scion interposed between the tongue of bark and the wood. Rules which apply to the shagbark may be applied to all of the hickories with which I have experimented. When cutting back the limbs in preparation for topworking it is well to leave as many as possible of stubs or branches of small diameter. Branches of small diameter may be grafted by ordinary cleft grafting methods but branches of larger diameter should be treated by the bark slot method. At the present time and in the locality of my country place at Stamford, Connecticut, melted paraffin suffices in place of grafting wax and melted paraffin is brushed over the entire scion, buds and all, as well as over the wound in the stock.

The time for cutting back hickories in preparation for topworking is probably important and in my experience to date, autumn cutting is preferable. The reason is that a good deal of activity is going on in the tree before it enters into a state of winter rest and wounds are pretty well repaired. In winter cutting there is some danger of incomplete repair and in the springtime the free flow of sap invites the entrance of various enemies, bacterial and fungous. Summer cutting according to the laws of plant physiology would cause more shock to the tree than cutting at any other time, although practically I have done this successfully. Without regard to season for cutting in preparation for topworking it is very important to trim cut ends very smoothly with a sharp knife in order to remove ragged tissue left by the saw. It is difficult to persuade employees to do this and it will not be done as a rule unless the owner looks after the matter personally. The smoothly trimmed end of the cut branch should immediately be protected with white paint, melted paraffin, or some other protective covering.

What are the disadvantages of the slot bark method of topworking hickories? The scion does not have such a secure hold upon the stock as it does in cleft grafting and it will blow out in a high wind unless it is protected by braces. I have found it not harmful to a tree to fasten laths to the stock for holding the growing scion, driving galvanized iron nails through the lath directly into the stock. Unless growing grafts are well braced by some method the entire season's work may be lost in two minutes of a gale preceding a thunderstorm in summer. By the slot bark method, in other words, we may catch more grafts and lose more grafts than by any other method with which I am familiar, but the loss may be avoided by proper attention.

The best time for grafting varies with the locality. At Stamford I have grafted hickories from February until September. Very early grafting is largely a failure because of incomplete repair of the wound in the stock and scion. Late summer grafting is not practical because the scions which make a start do not lignify their new shoots sufficiently to withstand the winter cold. In late April or early May when the sap is running very freely we also have a considerable loss of scions because an excess of water causes the scion shoots to grow too rapidly before wound repair has taken place to the point necessary for conducting nutrition for the growing shoots. Grafting after the leaves are pretty well out on the tree has given me best success. Grafting from then up to the last week in July has been found to be practical. Scions for top-working hickories have been employed for what I call "mediate" and "immediate" grafting. By mediate grafting is meant the employment of scions which have been cut while they were dormant and which have been stored in any appropriate way. Immediate grafting means the transference of scions cut from one tree and used upon another in the same hour or day. Mediate grafting is the sort which belongs to all history of the subject and immediate grafting relates more particularly to my recent experimental work.

Mr. Bechtel: What kind of wax did you use if any besides paraffin?

Dr. Morris: I have given up everything but that. The paraffin has a number of special advantages. In the first place, it seals any wound against infection from bacteria or fungi. It prevents moisture from rain carrying bacteria into the wound. It prevents evaporation from the cut surfaces.

Mr. Bechtel: Doesn't it melt too much in the sun?

Dr. Morris: It might with you and you might need to use a harder paraffin. There are a great many kinds of paraffin. The paraffin series is a large one in chemistry. The one I find best for our locality is the common parowax that you can find in any grocery store. I use just the pure straight thing but in your country you are further south and may need a different one. It does melt some in the middle of a hot day and will be nearly fluid sometimes but it hardens up when the sun goes down.

Mr. Foster: Were the grafts kept in cold storage?

Dr. Morris: I have used two ways of keeping grafts for top working. Some have been kept in cold storage, others have been kept in the ice house. I have been in the habit of kicking up the sawdust and dropping scions in the hole not very far above the ice. Last year I could not get any ice and two years ago I could not get any but the scions kept just as well in the sawdust near the ground. Then I have kept them packed in leaves with two feet of leaves on top of the scions. I have also kept some as Mr. Jones has but the difficulty is in keeping them at the right degree of moisture. The enzymes go to work the minute the cells of the scion have a full charge of water despite low temperature unless it is actually below freezing. Scions of another kind are the ones that I cut off from one tree and put on the next tree the same hour or day. That has only been possible by this method that I now employ. Almost any time in the summer we can do that without keeping the scions in storage at all. I gave some of them a resting period experimentally for a day or two but to no advantage.

Prof. Close: Don't you have to be pretty careful with the melted paraffin so as not to injure the tissue?

Dr. Morris: Yes we need special apparatus. I took a lantern, cut out the top and sunk a spun cup down in the lantern. On a cold day I turn the alcohol flame higher than in a warm day. I have been trying to have this lantern made so that it could be got on the market. There is nothing else to my knowledge that will allow the grafter to regulate the temperature of melted wax according to the weather. I am going to get it manufactured so you can each have one.

Mr. Bixby: There is a series of paraffines pure paraffines which are known only in chemical laboratories and also a number which can be obtained without much difficulty. The common parowax I think is the grade that is known in the trade as 120. That is it melts at 120 degrees F. but paraffin can be obtained without much difficulty that melts at 125°, 128° and 130°, so if the parowax is too soft for Mr. Bechtel's district I am sure he can get something that will be all right.

He might have to send to New York to get it but it is readily obtained there.

Mr. Bechtel: I have used bees wax and find that that melts at a higher temperature.

Dr. Morris: I want complete transparency.

Mr. Foster: Would it be out of order for a beginner to ask what type of grafting Dr. Morris uses in his work on these trees.

Dr. Morris: I think that somebody who was not a beginner might ask that quite as well. I have tried almost all the methods employed by the experts and have gotten down to very simple principles. If I am going to get fifty, sixty, eighty or ninety per cent of catches in hickory as we sometimes do I have to use methods that are very simple. For limbs that are small not larger than one's finger the plain cleft graft is good enough and I like as far as possible to choose a branch that is about the diameter of the scion. If the limb is larger in diameter than the scion I make my cleft to one side so that the cambium line of stock and scion will correspond. It is important to have cambium layers together. By all means the best feature of all in my grafting work is what I call the bark slot. This bark slot consists in making two parallel lines in the stock bark the width of the scion. I turn down that tongue of bark and stick in the scion. I turn back the bark again and bind all with raffia. That is the bark slot graft. The bark slot is by all means the most successful method that I have ever employed. What are the objections to it? Not so firm a hold on the stock as you will get in a cleft. What are you going to do about it? Put on good strong braces for the growing stock. I find it does not do much harm to drive galvanized nails right into the tree to hold the brace, three or four nails right into the limb, and then tie the rapidly growing shoot to the brace. If I do not do that the new shoot blows out very readily when I use the bark slot. In other words you will catch more by this method and lose more unless you give the grafts a good deal of attention.

Prof. Close: How do you trim the scion?

Dr. Morris: I trim it mostly with one good long cut on one side and sometimes turn it over and make a little nick on the other, but one good long cut is usually all that it needs.

Prof. Close: Supposing the bark does not peel?

Dr. Morris: If it does not I think the chances are against its catching your graft. I have done all my grafting until this year at times when the bark peeled but this year I carried it up into September after the bark had set and I am trying to see if I can get a catch then. In that case I take a chisel and chisel off the bark where it is hidebound. The experiment may be a failure but I have had so many failures that they are sort of a pleasant experience.

Mr. Foster: In the cutting back I understand that you prefer to do so when the tree is dormant. Then in the spring when you start your grafting do you leave that cut just as it is or do you cut it off again?

Dr. Morris: These are very important questions that are coming out. When you have sawed off the limb trim the end neatly with a sharp knife. An employee will almost always leave the cut end ragged but if you do it yourself and have smooth ends and cover them with paraffin you can graft right squarely on that end. Turn down your bark for a slot and stick in the scion at any time. If the cut end was made by someone who was not careful make a cut down through any living bark with a chisel or a knife until you get down to the wood, then make parallel lines from that point and turn down the tongue of bark. I have put in scions where I had to use a heavy chisel and mallet to turn down the tongue. It was not necessary to put on any binding there where the tongue of bark was so thick.

Prof. Close: I understand you to say that if the end has become dried you go down below the dried part?

Dr. Morris: When I find the end of the stub dry I go below that point to get live bark for grafting purposes. After my scion is well under way a year or so then I saw off any projecting stub beyond the graft and put paraffin over the cut end. That form of graft works very well except that it makes more work.

Mr. Littlepage: I have been very much interested in what Dr. Morris said. I found it no trouble whatever to get a hickory from four to six or eight inches to grow a great big graft, but I have never seen one live three years. I have my woods full of dead ones. I have one in front of my house now which I slip-bark grafted about the diameter of two inches and it is still growing but I expect an invitation to its funeral next spring. I have never seen a hickory tree successfully grafted over five inches in diameter. I found in my woods that the trees would sometimes die down to the ground. If they lived they would drag along for two or three years. If those of you who were out there yesterday had had a little more time I could have shown you those dead hickories. I would like to know what your experience is in grafting hickories over an inch in diameter.

Dr. Morris: That is an important point and it relates to the matter of cutting back to such an extent that it causes too much shock to the tree. In very large hickories I have cut them back to short stubs and have had a number of them die. On the other hand where I have cut back so that the largest limbs cut were not more than three inches in diameter those trees would do very well. I have living shag bark grafts now on trees that are from five inches to more than fifteen inches in diameter.

Mr. Littlepage: Do you cut these back in the winter or spring?

Dr. Morris: I do not remember about all. Some were cut back in both seasons. Winter is probably better. Autumn better yet.

Mr. Littlepage: I cut mine in the spring.

Dr. Morris: That has a lot to do with it if the trees bleed too much.

Mr. Foster: Are your pignuts native?

Mr. Littlepage: I think most of them are worse than that.

Mr. Foster: They are familiarly known in my state as pig nuts.

Prof. Close: You could top-work them.

The President: We will proceed with the next number. We are honored in having with us the President of the National Nut Growers Association who has come to us all the way from the southland to tell us about selection and propagation for the improvement of the pecan. I now have the honor of presenting to you Mr. Theodore Bechtel, President of the National Association.

Mr. Bechtel: Mr. President, Ladies and Gentlemen: After having listened to so many good papers and addresses it seems to me that as far as imparting any knowledge to this audience my trip may have been in vain. However I assure you as this is my first visit to Washington it lacks a whole lot of being in vain from what I have already seen and enjoyed. I may be able to add a few points to what has already been said.

SELECTION AND PROPAGATION FOR IMPROVEMENT OF PECANS

THEODORE BECHTEL, OCEAN SPRINGS, MISSISSIPPI

Mr. President, Ladies and Gentlemen: It is indeed a great pleasure to meet you all here in the interest of Horticulture, one of the greatest, and, by the way, the oldest industries of which we have any record, since Adam and Eve were engaged in it, and in the interest of one of the greatest branches of that industry, Nut Culture, and this in the greatest city on Earth, because it is the seat of Government of the greatest nation on Earth. We are all here, primarily, in the interest of Nut Culture and I venture to say that these meetings will not be in vain, as a congregation of such intelligence, interest and determination as I see displayed here is certain to accomplish much in the course of time. The very fact that there are many problems in Nut Culture to be worked out makes the industry the more interesting for those who are not looking for an easy get-rich-quick scheme. We have accomplished some things in the line of propagation of pecans which were said to be impossible only a few years ago, and they now seem easy. The problems you will have to work out in the Northern pecan section, as it appears to me, are selection and development of suitable varieties for your climate. This will no doubt be done by using the best hardy varieties you already have, some of which are showing good results, and crossing these just as is being done in the South now by our Government officials and by several private individuals. This great Government of ours has an Agricultural Department which is capable of performing tasks in the way of experimental work in this line on an extensive scale, which would be too great an undertaking for an individual, and we should use every effort to induce this work to be extended to the Northern sections, if it has not already been begun.

The results obtained by Mr. C. Forkert, of Ocean Springs, Mississippi, who was one of the first to take up the work, are highly interesting and give satisfactory evidence of what can be done by way of combining the good qualities of two varieties by a systematic scientific method of cross pollenizing and the work of Dr. Van Fleet, whose place we visited yesterday certainly was convincing of the great possibilities along this line of work. The fact that you have not the best now does not indicate that you will not in time surpass in results some of the sections where pecans now abound. Jackson County, Mississippi, had no native pecan forest to start with and yet we now have some of the best and most profitable orchards in the world, and it is the place where most of the standard high class varieties have originated.

In the selection of varieties upon which to build up your pecan industry be careful to choose varieties showing as many of the following qualities as possible: Productiveness, hardiness, early maturity, plumpness of kernel, good flavor and cracking qualities. The varieties selected for cross pollenization should combine as many of the desirable qualities as possible. By grafting from the young hybrids into the top of old bearing trees you may have samples of nuts in a very few years. The propagation of pecans in the Northern nurseries seems to be well under way and will no doubt be stimulated as orchard planting increases.

I might add as a suggestion that seedlings to graft upon be raised from seed obtained as near by and as nearly in the same latitude as possible as these will usually be found best adapted to local conditions of that section.

Whether grafting or budding is the best method of propagation will likely depend upon local conditions. We find in the far South that budding succeeds best in some localities while grafting is best in others. Ultimate results of the two methods in the orchards are equal. In sections where there are native pecans growing in suitable places these should be top worked to the best hardy varieties possible for quick results. The best method to do this work will also depend upon local conditions and seasons. The slip mark method of grafting as early in the spring as the bark will slip, will no doubt be one of the most expeditious, as it is quickly done, and in many sections is very successful, providing the scions are kept perfectly dormant and the waxing and tying are carefully done.

As commercial orcharding is still in the experimental stage in the Northern section of our country it will be well to sound a note of warning to prospective planters that they may avoid some of the mistakes that we in the Southern pecan belt made at one time. Next to the neglect, which some of the planters allowed their orchards to undergo, probably the selection of the wrong kind of land has been the cause of more disappointment than any other one source. A fertile soil deep, mellow, well drained sandy or gravelly clay subsoil should be ideal for pecans anywhere in the latitude in which they are hardy. However, many other types of soil are producing pecans, and if your home happens to be located where the soil is not ideal, you can still grow them by furnishing the elements which nature has failed to provide, if your soil is well drained and free from hard pan. The planting and cultivation, to be sure, must be carefully and thoroughly done to insure success anywhere.

I will say in conclusion that I believe there are wonderful possibilities in Nut Culture in this country of ours. We know it is an established fact that nuts are entered into the dietary of our upwards of one hundred and ten million inhabitants of the United States of America more and more from day to day. We have evidence of this in our importations of nuts, which have increased from year to year until they have nearly reached the enormous value of $57,000,000 for the year 1919 as stated by the American Nut Journal. Then, too, there certainly can be no more fascinating branch of horticulture combined at the same time with financial reward.

Now let me thank you for your attention and say that I only wish that every one of you might join us in our big meeting of the National Association at Austin, Texas, next week.

MR. FOSTER: A thought occurs to me in connection with Dr. Morris' idea of paraffin for use in warm climates. I happen to know as a patent attorney that in the manufacture of candles in order to give paraffin heat resisting qualities they introduce stearic acid. I have no doubt that it would be just as successfully employed in paraffin for the purpose of grafting. I think in candle making they add something like ten or fifteen per cent to the ordinary paraffin.

MR. LITTLEPAGE: I think we are very fortunate to have with us Mr. Bechtel and Mr. Perry from down South who are really in the nut business. The problem before us is varieties. If you want to plant black walnuts what walnut do you wont to plant? Just because I happen to say that Stabler is a first-class walnut does not make it so. If you want to plant English walnuts what variety? I said to Dr. Van Duzee a few years ago, "I wish I knew more about that variety." He said: "Don't bother about that. You will be top working them all in a few years." (Applause.) I have found a bigger pecan down in Indiana than the Major. It is a big type and I wish we knew more about it. I wish the Department of Agriculture would make an investigation and find out. What nuts to plant and what soil to plant them on and what varieties to plant it seems to me ought to be the trend of our talk here at these meetings, and I am glad that Mr. Bechtel has taken up that question.

Mr. Olcott: I think the members of the association would be interested in hearing a brief account from Mr. Bixby of the only commercial nut planting proposition in the North at present,—a very successful one. He has visited it within a week and I think he could tell us what varieties they have planted.

The Secretary: About a week ago I was at Alton, Illinois, at the place of Mr. E. A. Riehl. He has been a pioneer in many things, in fruit culture and what interests us more today in nut culture. He is outside the native chestnut belt and many years ago he planted some native American chestnuts. When the Rochester chestnut came out he planted it and he obtained from the late J. R. Parry of Parry, N. J., his best Japan chestnuts including the Reliance. He also obtained Boone trees from the originator the late Geo. W. Endicott, Villa Ridge, Ill. He has raised many seedling trees from the above varieties and planted a small hillside to them. Out of those he has selected the best and is propagating from them. He has chestnuts there that I wish I might show here, some that are fifty per cent larger than Paragon and with a better flavor. Furthermore they will drop out of the husks so that it is not necessary to pick up an unopened burr and heat it or pound it to get the nuts out. He has now between one and two thousand chestnut trees. Most of his chestnut trees however are seedling trees which do not bear nearly as well as his best trees. The greater part of his trees are in land that has never been cultivated. Many of his trees are not yet in bearing. Some of his trees however are now 25 to 28 feet spread and bearing heavily. He is certain that the yield of his orchard could be greatly increased by top working the poor bearers and that he is doing. Still he told me he obtained not less than 35c per pound for any of the crop and for some as high as 40c and 50c wholesale. In 1920 he produced over 4000 pounds.

In this connection a short history of the Boone tree will be of interest. In the spring of 1895 Mr. Endicott fertilized blossoms of Parry's Japan Giant chestnut with pollen of a native American chestnut and planted the nuts. This cross was made with difficulty for the American and Japan chestnuts do not bloom at the same time and it was several years after he had made up his mind to make the cross before he was able to do it. In the fall of 1897 one of the trees produced six burrs filled with nuts and was named the Boone. Since then it has borne as follows: 1898, 1 lb.; 1899, 3 lbs.; 1900, 5 lbs.; 1901, 6 lbs.; 1902, 8 lbs.; 1903, 12 lbs.; 1904, 17 lbs.; 1905, 25 lbs,; 1906, 31 lbs.; 1907, 43 lbs.; 1908, 50 lbs.; 1909, 56 lbs.; 1910, 5 lbs. (small crop due to hard freeze in April); 1911, 80 lbs.; 1912, 76 lbs.; 1913, 140 lbs.; 1920, 153 lbs. I am not informed as to the crops in 1914 to 1919 inclusive. Two other trees of the same parentage planted at the same time bore 128 lbs. and 168 lbs. respectively in 1920. If we consider that chestnut trees are set 40 feet apart each way, which means 27 trees to the acre, and estimated the crop at a fraction of that borne by the Boone tree we shall still have figures sufficient to show the wonderful possibilities of the chestnut in those sections outside of the native chestnut area of the country where it will succeed.

Mr. Riehl also has black walnuts. He procured a Thomas black walnut from Joseph W. Thomas & Son, King of Prussia, Pa., fifteen or sixteen years ago. From that original Thomas tree he has top worked a lot of seedling black walnut trees and he has I should think between one and two hundred in bearing at the present time many of them bearing heavy crops. It is very evident that Mr. Riehl has in his chestnuts and in his black walnuts gotten northern nut culture down to the point where it pays. I wanted to get Mr. Olcott to go there on his trip and get some facts from Mr. Riehl to present at this meeting. When I was there I had another mission in mind and I spent the time in getting what I went for. Consequently I did not get all the practical details and results in dollars and cents which we ought to have to demonstrate that it has been a commercial success. But I am satisfied that it is because he is constantly increasing his plantings.

Mr. Jones: Two years ago he favored black walnuts.

Mr. Bechtel: What has he done with pecans?

The Secretary: The pecan is native with him but he is probably pretty near its northern limit even though I have found it bearing good crops further north. The pecans I have seen at Alton do not seem to be bearing much. He has one or two northern varieties top worked on native pecans one eight years old and another one five neither one of which is bearing.

Mr. Bechtel: He had a very small choice nut that he prized very highly and sent me some scions to propagate for him I think about 12 or 14 years ago. I grew them on our native stock shipped them to him. I never followed it up to see what results he had. I think probably those roots may have frozen out if he had severe winters.

The Secretary: What he showed me were two of the standard northern varieties, I think Busseron and Indiana, which he had grafted on young trees. In southern Indiana they are doing much better. Grafted varieties are bearing but with Mr. Riehl it is the black walnut and the chestnut with which he is making a success.

The President: The next speaker has for his subject the southern pecan and how its commercial development came about. He comes from the one state in the Union of which I may be somewhat jealous. It is the only state east of the Mississippi River with a larger area than Michigan. (Applause). I take pleasure in presenting Mr. A. S. Perry, of Cuthbert, Georgia, Secretary of the National Nut Growers' Association.

GEORGIA'S PECAN INDUSTRY

A. S. Perry, Cuthbert, Georgia

My heart thrills with pride and pleasure as I stand in the Capital City of our great nation and bring greetings to the Northern Nut Growers Association from the fertile fields of the far South.

I am a southerner to the manner born. For six generations my people sleep in Georgia soil and for an hundred years my family have lived in the Albany district the queenliest section of the far south that rests resplendant as a jewel upon the snowy bosom of her royal mother Georgia and as beautiful as a cluster of fragrant flowers that nestles in the girdle of a lovely woman.

My imperial mother Georgia is a land of surpassing loveliness and thus has for ages been the inspiration of poets and painters too.

The southerners dream of beauty is the magnolia and who can tint her roses or paint the morning glory that points its purple bugle towards the sky as though to sound the revelie for a waking world. No prima donna has ever yet entertained the crowned heads of Europe with such music as that divine melody with which the mocking bird greets the coming dawn.

Ours is a land where skies bend blue and all nature seems to smile; where mosses veil the infirmities of decrepit oaks and vines spring unbidden from the ground to hide the scars of grey old walls; where the grape-vin staggers from tree to tree as though drunk with the purple juice of its own luscious fruit; where flowers lie at your plate on a winter's day and the humblest laborer carries in his dusky hand flowers fit to grace a May queen's crown.

As proud as I am of the beauties of Georgia I am prouder still of her material and natural resources. We have a vast undeveloped empire within whose borders there awaits the prospector such potntial treasure as would make the fabled wealth of Lydia's ancient king seem but a beggar's trifle, and the consuming ambition of my life is to see these resources developed to the fullest degree and then shall my imperial mother Georgia shine as the brightest star that gleams in Columbia's diadem.

But of all the natural resources of Georgia there are none to be compared to the possibilities in the development of our NATIONAL NUT the Paper Shell Pecan.

The history of the paper shell pecan is but another example that "a prophet is not without honor save in his own country," for native Georgians failed to avail themselves of the opportunity at their door and the credit for the development of Georgia's pecan industry belongs to the far sighted men and women of the North. Then why should I not feel grateful to such men and women as you believing as I do that the paper shell pecan industry is destined to lead Dixie out of her industrial bondage and restore her to her rightful place among the sisterhood of states.

"History repeats itself" says the soldier and there is pictured in his mind vision of other Shenandoah Valleys swept by the fiery broom of war and other Atlantas and Savannahs given to the flames on some other Sherman's March to the Sea.

But history has repeated itself; the North has again invaded the South but not with drum and fife and armed hosts and has been met not with shot and shell but with a genuine southern welcome and from this commingling of northern capital and energy with southern soil and sunshine has sprung a new industry of such roseate promise as to almost make the story of Aladdin's Wonderful Lamp fade into insignificance and Dixie's imperial product, the cultivated paper shell pecan makes her bow to the world.

French explorers as early as 1740 left authentic records of pecans in the Mississippi Valley and the many giant pecan trees scattered from Maryland to Texas which the scientists tell us are hundreds of years old seem to indicate that the pecan is a native of America whose origin is lost in prehistoric times.

The earliest financial transaction in pecans that has come to my notice was in 1772 when William Prince of Flushing, New York, sold in England eight pecan trees for ten guineas each. These trees were grown from seed planted by himself.

Prior to 1890 there had been little if any attempt to plant pecans in orchards but about this time a few scattering seedling orchards began to appear.

In October 1902 about thirty owners of small pecan orchards met in Macon, Georgia, and organized the National Nut Growers Association. Of those pioneer growers only three remain today as active members of the Association, Theo. Bechtel, H. C. White, and O. P. Mears.

By this time the art of budding and grafting having become reasonably well known several pecan nurseries came into bearing and orch ards of budded trees began to appear and the foundations of a real industry were laid. About this time the nursery crook began to appear and sold thousands of worthless trees but despite this handicap pecan culture continued to spread and shortly thereafter attracted the attention of Prof. John Craig of Cornell who after investigation pronounced it safe sane and profitable. He also made a study of the various sections and decided that the Albany district was the ideal section for profitable pecan culture.

This announcement by Prof. Craig was sufficient to induce northern capitalists to begin developing the Albany district on a commercial scale and several companies entered the field planting many thousand acres to be sold in units. As an evidence of the lack of faith on the part of local land owners let me say that a few weeks ago I read the original contract between one of the pioneer development companies and the gentleman from whom they bought their land. This contract was dated early in 1908 and provided for the sale on time payments of several thousand acres of land closing with the limitation that unless as much as 100 acres of this land were planted in pecans and sold in 1920 the contract was to be null and void. As a matter of fact this company developed and sold about 4500 acres in less than five years. They have long since retired as developers and give their entire time to the care of their immense orchards and the sale of their nuts which annually run around two hundred thousand pounds.

More than one of these pioneer development companies found themselves in financial difficulties due to the fact that they had sold their orchards too cheaply. Pecan growing is expensive, much more so than the average man thinks and the pecan orchards in the Albany district today that do not meet the expectations of their owners are mostly those that suffered for lack of money. Those companies with financial resources and intelligent horticulturists have developed orchards that are a source of perennial pleasure and profit to their owners.

The cultivated paper shell pecan is as superior to the wild seedling as is American gold to Mexico's money. These wild seedlings are small in size artificially colored a bright red and have a sharp, astringent taste and have a commercial value only because they are used to lower the price of mixed nuts.

When the average man hears the word "pecan" he instantly thinks of the bitter red little nut which is ever present in the supply of Christmas goodies but which is religiously culled and fed to the glowing grate. Mr. Average Man never even heard of the southern paper shell pecan. In fact, up to the present time, the demand has far exceeded the supply and but little if any effort has been made to develop new markets. I think it a conservative estimate that not ten per cent of our population have ever tasted a paper shell pecan.

The paper shell pecan is our national nut and its only competition in the markets of the world is the ignorance of the public. Acquaint the public with its merits and there will be a demand for a million times our present supply.

Away with the thought of overproduction. The "avalanch of nuts" is an old wife's fable. Do not talk to us about overproduction. when the food problem is giving the gravest concern to the master minds of the world. With population increasing and food supply diminishing the gaunt specter of famine is creeping closer and closer to the homes of men even in our own favored land.

Hunger knows no armistice. It conquers amid the snowdrifts of the North, where the grand army of Napoleon found its winding sheet. It conquers amid the burning sands of the south where the phalanx of Alexander halted in mutiny. Away with such nonsense as overproduction in discussing this the choicest food product ever given by a gracious God to a hungry world.

The ideas of yesterday do not fit the ideals of today. When conditions shift opinions must be adjusted accordingly and the pioneer growers are about to realize their golden dreams and reap their reward, for their orchards are coming into bearing and yielding tons of beautiful brown nuts for which they find a ready sale at prices ranging from 50 cents to 75 cents per pound and at even higher prices for extra fancy stock.

No doubt many extravagant statements have been made about the pecan industry but why exaggerate when the plain truth staggers the reason? Why draw on the imagination when reputable growers in the Albany District certify to returns to non-resident owners of $300 per acre in a single season.

This is one infant industry that will not cry for a protective tariff. Never will Capitol Hill resound with the eloquent plea of some statesman urging that the southern paper shell pecan industry be protected by a tariff wall.

The paper shell pecan is the horticultural triumph of the ages the gift of a gracious God who no doubt could but never did produce a finer nut and who in his inscrutable wisdom gave a natural monopoly in its culture to the lower cotton belt for no where else on the habitable globe does it reach the perfection attained there.

The Mississippi Valley has been called the cradle of the pecan industry and Georgia its nursery.

Almost all the standard varieties of pecans have come from the lower Mississippi Valley, Jackson county, Miss., perhaps leading the procession as she is the mother of no less than twelve of the standard varieties now fruiting in thousands of orchards making heavy the pockets and light the hearts of as many owners.

Southwest Georgia has monopolized the pecan nursery business. Given Albany, Georgia as a center and scribe a circle with a sixty mile radius and you have inclosed the area from which 90% of all pecan nursery stock has come. This circle includes Monticello, Florida, which probably is entitled to the honor of having grown a greater amount of pecan nursery stock than any other one community.

Texas produces the bulk of the pecan crop well informed men stating that nine-tenths of the pecans come from the Lone Star State. This may be correct but practically all Texas pecans are seedlings and while some are of real merit the bulk of the Texas crop goes to the crackeries.

The pecan belt roughly speaking is the lower cotton belt and includes in a general way the southern part of South Carolina, Georgia, north Florida, Alabama, Mississippi, Louisiana and parts of Texas and Oklahoma. The paper shell pecan grows to perfection in this limited area and nowhere else but all varieties do not thrive alike in the different sections and the growers have long since learned this and have eliminated the cumberers of the ground and replanted with those varieties adapted to that territory.

To successfully develop a pecan orchard requires money, brains and everlasting bull-dog determination for the lean years with all going out and nothing coming in try the patience and test the nerve of the stoutest man. In pecan growing even as in love-making "faint heart ne'er won fair lady."

While the kingdom of the pecan stretches from Charleston to the Rio Grande, the seat of government the capital city is Albany, Georgia, for in the charmed circle known as the Albany district is to be found a greater number of cultivated paper shell pecan trees than in all the world besides. Here it is that abundant northern capital applied to southern soil and sunshine has made the desert to blossom like the rose. Here it is that abandoned farms scarred with gullies and over grown with briar have been touched as with a magic wand and transformed into a veritable fairyland of flower gardens and fertile fields dotted with hundreds of thousands of beautiful pecan trees that lift their majestic heads towards the sky as though proud of their royal lineage. Here it is that the Mexican boll weevil before whose blighting breath our snowy fields of cotton melted over night brought no terror for King Cotton no longer reigns supreme. The king is dead but the people rejoice as the scepter falls from his nerveless hand and a new monarch ascends the throne. Millions of royal banners flutter in the breeze glistening green with promise for the future and hope is high, and the hearts of the people light as they gather to pay homage to the new monarch, Her Imperial Majesty the Paper Shell Pecan.

THE PRESIDENT: We now have arrived at the time when we should go ahead with some of our business work and probably the first thing we should take up is the report of the committee on nominations.

MR. OLCOTT: Your nominating committee regards it as especially fortunate that the association has a board of officers so well equipped as is the one under which the organization has just completed another year. For that reason and also because in a single year officers can scarcely put into effect plans they may have in view, the president especially being of necessity engaged largely in becoming acquainted with the field and the membership, your committee recommends the re-election of the present officers: President, Wm. S. Linton, Michigan; Vice-President, James S. McGlennon, New York; Treasurer, Willard G. Bixby, N. Y.; Secretary, Dr. W. C. Deming, Connecticut, and the executive committee as at present composed.

The Northern Nut Growers Association has reached the stage of advocating strongly the planting of nut trees of the kinds the Association has investigated. Roadside planting appears to offer an immediate field for activity and President Linton's leadership by reason of his special interest and activity in this field is particularly needed during the coming year when through the urging of this and other societies it is expected many states will follow Michigan in the matter of roadside tree planting.

We believe it would be a matter of particular satisfaction to any nominating committee of this association (as it is of this committee) to recommend continuation in office of Treasurer Bixby and Secretary Deming. (Signed)

Ralph T. Olcott
T. P. Littlepage
Robert T. Morris
C. A. Reed
C. P. Close

Mr. Littlepage: I move the adoption of the report and that the secretary be instructed to cast the entire vote of the association in support of the report of the committee.

Mr. Jones: I second the motion.

The motion was carried.

The President: Ladies and gentlemen. When I started for Washington it was with the determination that another should succeed me as president of the association the one reason being that my time had been so occupied during the past year that it seemed impossible for me to go ahead with the work as it should be done as president of this organization. Now I am going to accept the election which you have so kindly conferred and I am doing it for two reasons. I like the association and the membership of this organization. I feel for the other reason that my work has not been completed and I desire to finish it. Now then you should have your membership doubled. Every last member of the organization should put forth efforts this year towards that end. Here is one plan that I have under way. I asked the faculty of our agricultural college at Lansing if they would undertake to supply me with the names of those who have nut trees in Michigan not the ordinary kind but those producing good nuts and in plenty. I have the names of from fifty to on hundred of those men owning perhaps a thousand good nut trees. I do not believe that there is one of those men but would become a member of this association if the matter were properly presented to him. We have in Michigan 1.500 townships or more. Now we have a way of reaching the supervisors of those townships through some of our departments and we can practically take a census of the nut bearing trees in Michigan so that instead of having from fifty to one hundred names here we should have several hundred. Really 75 per cent of those men should be members of this association. Now what we hope to do this year in Michigan I feel can be done in every other state that is interested in our particular work. I want to ask your co-operation you who live in other states to assist in doing it. Then when we meet a year hence I hope it may be somewhere in the central West. You honored our state last year with the annual meeting. Of course we would like to have you there again. You are welcome. We would be glad to receive you but Michigan has been thus honored and I imagine that it would add to our force in other sections to hold the meeeting elsewhere, in Illinois or Iowa or perhaps even a little further west. Some associations are now meeting in Yellowstone Park and if we should go there we would have the states of Idaho, Montana, Utah and Wyoming. We should get membership in all of those states. The place of the next meeting I think is very important. Now I think I have plainly stated my position in the matter and I am going to try to serve you another year. I hope that at the end of that year we will have our membership at least doubled. Let us try and treble it. I thank you. (Applause).

The next subject under discussion then will be the place of meeting.

The Secretary: The by-laws say that the place for the next meeting shall be selected by the convention assembled or in the event of failure in that by the executive committee. Sometimes we have done it one way and sometimes the other. The proper thing to do I think is for the advocates of the different localities to now present their attractions.

Mr. Pomeroy: Our vice-president when he left asked me to suggest Rochester, N. Y. While at Rochester Niagara county is only a short automobile or trolley ride away. In Niagara county are quite a good many walnut trees in bearing.

Mr. Rush: Mr. President, I invite this association to convene next year in Lancaster City, Lancaster County, Pennsylvania. We can show you a very prosperous nut nursery and some young bearing walnut trees and Harrisburg and other places of interest. I am satisfied that you can not meet at a more convenient place than Lancaster City. Therefore I extend the association a hearty invitation.

The Secretary: I would like to hear from Mr. Reed as to the attractions of the eastern shore of Maryland.

Mr. Reed: There are several places, Mr. President, where I wish you might go next year. One of those places is the eastern shore of Maryland. As I told you last year I regard the eastern shore of Maryland as one of the promising places of the whole East for the development of nut orcharding and I find there a great deal of latent interest and a great deal to see. I am a little disappointed that we have not some representatives here at this meeting from the eastern shore. I am sure that if we should decide to go there we would be received with enthusiasm and we would be shown something that would be quite a surprise to most of us.

Then another place that I would like to have considered for some meeting in the near future is the middle West. The Professor of Horticulture in Missouri is a warm personal friend of mine a classmate of mine in college, and he is very enthusiastic about the possibilities of nut culture in that state. He is waiting to be told or shown how to go ahead, and if we were to go out there I am sure he would follow the lead if we set the pace. He would take hold and push the nut industry in that section. In that same neighborhood is the orchard that Mr. Bixby told us about the chestnut orchard of Mr. Riehl of one or two thousand chestnut trees planted on hillsides that have never been plowed and which are giving Mr. Riehl a very lucrative income. Mr. Riehl is 83 years old and is not going to live always. We certainly ought to see that place while he is there. We have no invitation out there and none from the eastern shore and I am always in favor of going where we have an invitation. It would be my feeling in view of the present situation that we accept one of the invitations that have already been given to us.

Mr. Rush: We met once in Lancaster about eight years ago but at that time we had little to show. We had no nut nursery of any consequence at all and no bearing walnut trees at that time. Now we have them in their prime.

Dr. Morris: I would like very much to go to both places, the ones described by Mr. Pomeroy and by Mr. Rush.

Mr. Jones: I would like to say that we were at Rochester three years after Lancaster and I think Lancaster is entitled to it if you take time into consideration. I think Lancaster is entitled to the meeting now.

Mr. Littlepage: I move that we accept the invitation of Mr. Rush and Mr. Jones to meet in Lancaster, Pennsylvania next year. I am going to couple with that another motion which you can consider if you desire and that is that we fix the time of meeting. I think that rather important. I think there are many reasons for it. These meetings are attended by many people who must know as far in advance as possible. Quite a good many people take touring trips over the United States and if they know when these meetings are going to be held they would be very glad to time themselves to be at that point at that particular time. For example a few years ago when we had a meeting here Mr. Groner toured here from Oregon and timed his trip to be here. Later he timed his trip to be at the national meeting at Mobile, Alabama. It is very important because we all take vacations and we have to make our vacation arrangements in advance. It seems to me that the time would be fixed now instead of letting it lie over and finally select the wrong time. I therefore move that we accept the invitation of the gentlemen from Lancaster and then that we fix the time.

Prof. Close: I second the motion.

The motion was unanimously carried.

Mr. Reed: Mr. President, I would like to make a suggestion in regard to the date. There are two purposes that we have in mind. One to see things growing and another to see the product. We can hardly do both the same year. This year we have seen things growing. We have had almost a summer meeting and it seems to me that unless the local folks who have invited us to Lancaster should disagree we might well afford to have our next meeting a December meeting. Then we can see nuts. We can discuss nuts themselves. I would make that motion that our meeting be the second week in December the Wednesday and Thursday of the second week in December, 1921.

The Treasurer: Would not the prime object in going to Lancaster be to see things grow? Wouldn't it be difficult if not impossible to really accomplish that by a December meeting?

Mr. Littlepage: I think a winter meeting might just as well be held in New York or Baltimore or Washington. I do not agree with Mr. Reed. If I go to Lancaster I would go to see things. I went up there one December and nearly froze.

Dr. Morris: We could split the difference between the two. I think Mr. Jones and Mr. Rush should be consulted in the matter.

Mr. Rush: I think it would be important to have it the same week as the York Fair as they have the reputation of never having any rain and this is a very good time of the year to have an exhibition. You see the fine crops and everything which is agricultural and horticultural. And another thing in connection with this we can see the hazels on the bushes at this time of the year.

Dr. Morris: I move that we meet about this time next year.

Mr. Rush: I think this week in 1921.

Mr. Littlepage: In order to get the matter before the meeting I move that the convention next year meet at Lancaster, Pennsylvania on the Thursday and Friday of the first week in October.

Mr. Jones: I second the motion.

The motion was unanimously carried.

President Linton: Before closing I want to call to your recognition a kindly act that I know will please you all. Yesterday while we were having our pictures taken I lost this package of papers. Today it has been returned to me by two boy scouts. From what I know of that organization I do not believe that there is anything doing the boy any more good than their training. I am interested in a forty-acre piece of land on Lawton Lake, Michigan, on which this year we permitted the boy scouts to camp. I followed their training somewhat to ascertain what it was. I was in camp with them two or three days and learned that it is a training that is doing the boys of the country a lot of good. Their motto as I understand it is to do good or to be of service to others. These two lads that brought this package to me refused to receive any compensation whatever. They are the two who have tramped from New York City to San Francisco and are now on their way back. If these boys or their organization ever get interested in our movement in the planting of nuts throughout the country we will be glad to help them.

Prof. Close: There is one committee whose report has not been called for and for the sake of the record I presume it might better be offered. That is the auditing committee. The committee was composed of Messrs. Reed and Close and we desire to say that the report of the treasurer has been scrutinized very carefully and we are not able to detect any mistakes. The balance in the treasury is $75.26;

total receipts including the amount on hand at the beginning of the year $666.48; total expenditures $591.22, leaving a balance in the treasury of $75.26.

The Treasurer: I want to offer a resolution that Article III of the by-laws on *Membership* which now reads, "All annual memberships shall begin with the first day of the calendar quarter following the date of the association" be amended to read, "That all annual memberships shall begin with the first day of such calendar month as shall be agreed upon."

Now I will tell you why I ask that. Most of the memberships are combined with the subscription to the American Nut Journal. In many instances the new members have requested that their subscription to the journal be dated back one or two months for the sake of getting one or two numbers of the journal. In some instances they are already subscribers to the journal and they want to change it to make it come the same time. I offer that amendment to the by-laws.

Mr. Reed: I move that the change be made.

Dr. Morris: I second the motion.

The motion was carried.

The Treasurer: Here is another thing I think is a matter of a good deal of importance. There has been spoken of two or three times during the day the great progress which is likely to be made in systematic hybridization of nuts. It has come to my knowledge recently that the Arnold Arboretum is seeking to establish a regular plant breeding department. They have growing on their grounds the greatest collection of trees and shrubs that will grow in that section that can be found anywhere in the country. I want to offer a resolution as follows:

WHEREAS it is the firm belief of the Association that one of the most hopeful sources of obtaining nuts better than we now have is by carefully planned and executed work of hybridization, and

WHEREAS such work, particularly in the case of the slower developing nuts, such for example as the hickories, will require the uninterrupted carrying out of carefully planned work for a long series of years, and

WHEREAS the Arnold Arboretum, of Jamaica Plain, Mass., has on its grounds a greater collection of the trees and shrubs from all parts of the world that will grow in that location than can be found anywhere else in the country, including a large number of hickories of various species in bearing, and

WHEREAS the Arnold Arboretum is now assembling on its grounds the various propagated nut trees, and has expressed its intention of continuing this work and of including all varieties that it may be able to obtain of those hickory trees notable for any one quality and which may promise to be valuable for hybrizing purposes, and

WHEREAS the Arnold Arboretum is desirous of establishing a regular plant breeding department where nut trees, particularly hickories, as well as trees valuable for timber purposes, flowers, etc., may be bred, and, in order to provide for the uninterrupted carrying out of this work is seeking to raise an endowment, be it hereby

RESOLVED: That the Northern Nut Growers Association assembled in the City of Washington, D. C., this 8th day of October in the year 1920 heartily endorses this purpose of the Arnold Arboretum as one likely to promote the acquisition of finer nuts than we now have, and urges all persons able to do so to aid in any way possible.

DR. MORRIS: I move that we adopt that resolution.

MR. REED: I second the motion.

The motion was carried unanimously.

THE PRESIDENT: If there is nothing before the body at this time I will declare the eleventh annual session closed.

APPENDIX

From C. K. Sober, Lewisburg, Pa.:

My bearing chestnut trees, most of them, have gone out but in the 40 acres of chestnut nursery stock I find there are thousands of trees that seem to be immune from the blight up to this time. While they stand right beside trees in the nursery that have died from blight yet there is not a spot on them.

From W. O. Potter, Marion, Illinois:

I am putting forth every effort to develop a nut orchard here in southern Illinois the like of which will not be excelled in this state. My pecans are doing nicely. I have five acres already set to budded trees and fifteen acres planted to seedlings which I hope to bud next year. I have budded chestnuts, black walnuts and almost all varieties of nuts that will grow here in the North. I am using filberts for fillers among my pecans.

I have just harvested my first crop of filberts from my experimental garden here in town and my bushes at Halcyon Frunut Gardens (this is the name of my nut farm) are growing nicely and some have catkins for next year's crop. The filberts that I have just harvested were borne from three Cosford bushes of the French strain. I have some German strain that I received from Mr. McGlennon that are full of catkins for next year.

I had some pecans to bloom last spring, but they failed to set any nuts. I have about a peck from two budded Thomas black walnut trees that are four and five years old. I have one Stabler that has two nuts on it now only three years from transplant. My Rush seedling chinquapin that bore last year has only about six nuts on it this year but they have not yet matured.

I hope some day to have a nut orchard that will be the show place of southern Illinois and then I will invite the association to have an annual meeting here and at my farm.

From G. H. Corsan, Toronto, Canada:

This time I can say that my trees never looked so well. All passed through last winter and the terrible winter of three years ago. My list consists of the following: Constantinople hazelnuts, Kent filberts, Manchurian juglans regia, Jap heart nuts, Pomeroy juglans regia, Canadian seed juglans regia, common native chestnuts, Col. Sober's paragon chestnuts, castanea crenata.

The chestnuts grew a foot or more from all terminal branches, not a twig winter-killed. Constantinople hazelnuts grew two feet from all terminal branches and not a bud winter-killed. Kent filberts killed back some branches, others did not, grew well this summer from 1½ feet to a yard.

There is a huge crop of Pomeroy paragon chestnuts on my trees this year. No blight near me, as thank heaven the farmers around me are too stupid to plant chestnut trees and in fact no farmer ever planted a nut tree with two exceptions within 20 miles of me. But one farmer by name of Anderson planted a mile of black walnuts along the roadside 75 years ago. These trees are loaded with nuts and boys just now and they reach away up higher than the tallest phone wire (that is the lowest branches do).

All juglans regias grew a yard from each terminal bud. My Pomeroys after killing back for several years have at last got a real good start and are going to live and bear. When I see a bluish tinge to the leaf of juglans regia, together with a smooth glossy leaf not too long—having 7 and not 17 leaves to the stalk—and having a very white grey bark, then I know that the nut will be EXTRA good, and though that type of tree is a bit tender and requires water in the early and mid-dry summer, as well as hard wood ashes, lime and chicken manure in the late fall, this is the tree that on the north side of Lake Ontario where I am now some day will bear and ripen real nuts.

My grapes and peaches ripen well this fall, though we as all others had a late spring and my Indiana and Iowa pecans actually grew 2 feet from terminal buds.

Were I an old man of 80 I would plant nut trees to the exclusion of every other work. First, I would be growing a crop of food 150 years after my death. Second, I believe that every man who has vitality to live over 80 has been a bad man in his youth and he owes it to the world. Third, It is a healthy occupation, stooping down and digging and takes the rust and poisons out of the system. Fourth, there is a joy seeing the leaves and branches grow the next summer and in old age one must feed and take joy from the eye and ear more and more and less and less from the mouth and stomach. Fifth, it it not at all an unreasonable supposition that as a boy again I may be climbing the same trees that I planted. And if I knew for certain that I would not be then some other boy will take my place.

The salvation of the future is more and more food from trees and less and less from animal sources. The day is fast passing when the farm consists of a tobacco barn, a pig pen, a cow stable and a hennery. From living upon a badly selected type of food we fear the flu and other diseases. No disease will ever come out of a nut tree. But we are a lot of fools and blame the absolutely innocent cucumber for what a vile mixture of salt and vinegar does to us and thus these same asses will say, "that nuts are unhealthy" and we pay a billion dollars out every three months to have the dentists fix our teeth that never receive any nut grinding exercise!

From J. F. Jones, Lancaster, Pa.:

I expect as you do that there will be no need of much room for the convention. The fact is that without any commercial nut planting in the territory covered by the Northern Nut Growers Association it is remarkable that there has been as much interest as there is. I happen to know that the southern pecan (National) Association was kept going by the nurseries down there for a good many years, or largely by them, and without the commercial planting of the pecan there I do not think the Association would have kept going very long even if it had been founded.

I believe eventually there will be some interest in commercial planting north but it will go pretty slow and be after our time I judge. In commercial planting I mean plantings of not less than ten acres. I occasionally sell orders of 50 and even 100 trees, but they are usually scattered as to kinds and varieties of nuts and evidently designed to test out on a fair scale the merits of the different nuts. A man was here a few days ago and gave me an order for nearly a hundred black walnut trees. He has been planting for several years, starting with a half dozen trees three or four years ago and reports the trees doing fine. I presume you could call his planting this year a small commercial planting as that is what he has in mind.

The boom in planting fruit trees has taken some interest away from nut planting and this will continue as long as fruit is selling well.

From T. C. Tucker, San Francisco, Ca.:

Your program for the approaching meeting of the Northern Nut Growers Association, which has just reached me, is a most interesting one. It is with regret that I find I shall not be able to be with you. This is shipping season for the California Almond Industry and my presence here at this time is imperative.

While through the California Almond Growers Exchange I have for some time been a member of the Northern Nut Growers Association, I have not as yet had the pleasure of meeting with you, but I want to extend you a cordial invitation to visit California and I hope that at some future date a convention of the Northern Nut Growers Association will be held in this state. Here, as nut growers, you will find much of interest. This is the only state in the Union producing almonds commercially. Our 1919 crop was worth approximately $4,000,000.00 and represented 7000 tons of nuts. Here in this state we also produce the California Walnuts which in 1919 brought a return of approximately $20,000,000.00. Both of these industries are in their infancy, particularly is this true of the almond. It is estimated that there are 100,000 acres in California planted to almonds, the major portion of which is nonbearing.

We are now preparing for the future through an energetic sales campaign and by making plans for manufacturing by using almonds in new and attractive preparations. In 1919, the California Almond Growers Exchange, a non-profit association of 3800 farmers, spent approximately $208,000.00 for National Advertising and the expenditure in 1910 will exceed a quarter of a million dollars. This is done not only to sell the crops of 1919 and 1920 advantageously, but to educate the consumer up to the high food value of the almond and incidentally to lay a substantial foundation for future business.

We believe that the outlook for the California Almond is promising, but it is only as promising as the growers co-operate to that end. We believe that by a strong association of growers, quality and grades can be improved, distribution widened and the public made acquainted with the value of our product through the medium of our advertising.

We are also taking up at this time the cultural question endeavoring to eliminate the undesirable varieties and improve those which are commercially profitable.

We have some eighty odd varieties of almonds in this state, many of which are not known commercially. You will thus see that we have quite a problem in cultural lines.

The principal object of the Northern Nut Growers Association, I believe, is the diffusion of knowledge on cultural questions, but a word of co-operative marketing may not be amiss.

Our investigations have shown that for twenty-five years before the war Nonpareil Almonds (our highest priced variety) retailed at about 30c per pound. The grower received from 7c to 10c per pound, the average being close to 8c. This was before the association was formed. After the association was organized, the grower received, through co-operative marketing and by the elimination of speculation and waste in distribution, a range of from 14c to 20c for Nonpareils with an average of approximately 16c while the price to the consumer remained about 35c. During the past two years, the price to the consumer has of course advanced to meet the increase in cost of transportation, cost of doing business and of production. As a matter of fact, the increase in price to the consumer has not kept pace with the big increase in the cost of production. The point I wish to make, however, is that co-operative marketing has on the average, by the elimination of speculation and, as before said, by minimizing waste in distribution, secured for the almond grower a living price.

We do not believe that the marketing problems of the farmer will ever be satisfactorily solved until he takes them up through co-operative methods and solves them himself.

My work for the past eleven years has been in connection with the sale of almonds and I am happy to say that while our country is going through a period of trying re-adjustment at the present time, the association has meant to the almond growers of California a wonderful insurance against loss. The consumer, too, has been benefited as this association has been able to lay down almonds in the markets of the United States at a lower distribution cost than would otherwise have been possible.

However, assuming that this convention is interested mostly in cultural questions, I shall refrain from further discussing the marketing problem. Let us not however, lose sight of the fact that it matters not what may be the quality of our product if we cannot dispose of it at a profit.

A satisfactory margin of profit means improved varieties, better culture, increased yields and better satisfied producers. Scientific yields and better satisfied producers. Scientific cultural effort, to achieve its highest possibilities must inevitably be linked with commercial success.

ATTENDANCE

Dr. J. E. Cannaday, Charleston, W. Va.
Conrad Vollertsen, Rochester, N. Y.
J. P. Beck, Saginaw, Michigan
Prof. C. P. Close, Maryland
B. C. Foster, Washington, D. C.
J. W. Ritchit, Yonkers, N. Y.
Dr. G. J. Buist, Brooklyn, N. Y.
T. P. Littlepage, Washington, D. C.
C. A. Reed, Washington, D. C.
Mrs. C. A. Reed
William S. Linton, Saginaw, Michigan
W. C. Bixby, Baldwin, N. Y.
Mrs. Bixby
A. S. Perry, Cuthbert, Ga.
Dr. W. C. Deming, Wilton, Conn.
R. T. Olcott, Rochester, N. Y.
W. R. Fickes, Wooster, Ohio
A. C. Pomeroy, Lockport, N. Y.
Elam G. Hess, Mannheim, Pa.
F. E. Brooks, French Creek, W. Va.
W. N. Roper, Petersburg, Va.
Mrs. Roper
Dr. R. T. Morris, New York City.
Dr. J. H. Kellogg, Battle Creek, Michigan
J. F. Jones, Lancaster, Pa.
Miss Jones
Dr. J. B. Curtis, Orange Heights, Fla.
Mrs. Curtis
Dr. John F. Keenen, Brentwood, Maryland.
J. S. McGlennon, Rochester, N. Y.
H. C. Best, Bridgeport, Conn.
J. E. Brown, Elmer, N. J.
E. E. Reynolds, Washington, D. C.
J. G. Rush, West Willow, Pa.
D. F. Clark, Harrisburg, Pa.
Theodore Bechtel, Ocean Springs, Miss.
Mrs. Bechtel
Miss W. M. Daish, Washington, D. C.

EXHIBITS

Morris hybrid chinquapin No. 1—From graft set spring 1910 on bush chinquapin stock. A scientific cross or hybrid made by Dr. Robert T. Morris New York City. Very resistant to blight is not blight proof. Has the fruiting habit of the chestnut and bears on very small bushes or trees. Grown by J. F. Jones, Lancaster, Pa.

Morris hybrid chinquapin No. 2—From grafts set on stocks of the bush chinquapin spring 1919. Similar to No. 1.

Chinese pine nuts, Pinus armandi, from the mountains of North China. The Chinese pine nuts, P. armandi and P. bungeana, although not equal to some of our own pine nuts from the southeastern states, are considered the best and most reliable for eastern and northern planting in this country. Sent in by J. F. Jones, Lancaster, Pa.

Bush chinquapin Castanea pumila, grown by J. F. Jones. Branches of ordinary wild nuts.

24 plates hazels or filberts grown by Carl Vollertsen, Rochester, N. Y.

Nine varieties J. regia, peanuts, hazels and Weicker shellbarks, grown by J. G. Rush, West Willow, Pa.

23 plates and varieties of the southern pecan, sent by A. S. Perry, Cuthbert, Ga.' Also collection of photographs.

Specimens of the Beam, Beaver, Clark, Manahan, Stanley, Swaim and Weicker hickories by W. G. Bixby, New York.

Miscellaneous nuts by W. C. Deming, Wilton, Conn.

Large table map of the United States with the different nuts grown therein so placed as to show their native habitats. By C. A. Reed, Nut Culturist, Dept. of Agriculture.

Specimens of Corylus avellana, Montebello Bysance and other nuts by Dr. David Fairchild, Washington, D. C.

By Prof. C. P. Close, College Park, Md., plates of seedling J. regia from J. W. Smith, Centerville, Md. Five seedling J. regia probably Mayette from S. H. Derby, Woodside, Del. Japanese seedling chestnut from J. W. Killen, Felton, Del. The tree on which they grew has never blighted. J. Sieboldiana from tree set by Prof. Close in 1910, first crop 1920.

Native chinquapins and two varieties of Dr. Van Fleet's hybrid chinquapins. Major pecans borne in 1919 on three year graft set by Prof. Close at College Park. A hazel seedling from New Jersey grown on four year old graft. Large and good.

By Dr. R. T. Morris of New York, plate of pistache nuts, 6 varieties of hazels, 1 of black walnuts and one of butternuts.

Nut cracker for pecans of different sizes.

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NORTHERN NUT GROWERS ASSOCIATION

REPORT

OF THE PROCEEDINGS AT THE

TWELTH ANNUAL MEETING

LANCASTER, PENNSYLVANIA

OCTOBER 6 AND 7, 1921

NORTHERN NUT GROWERS ASSOCIATION

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Finance—T. P. Littlepage, Willard G. Bixby, W. C. Deming

Hybrids—R. T. Morris, C. P. Close, W. G. Bixby, Howard Spence

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Nomenclature—C. A. Reed, R. T. Morris, J. F. Jones

Press and Publication—R. T. Olcott, W. G. Bixby, W. C. Deming

Programme—James S. McGlennon, W. C. Deming, R. T. Olcott, C. A. Reed, R. T. Morris, W. G. Bixby

Promising Seedlings—C. A. Reed, J. F. Jones, W. G. Bixby

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April, 1, 1922

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Patterson, J. M., Putney
Perry, A. S., Cuthbert
Steele, R. C., Lakemont, Rabun Co.
Wight, J. B., Cairo

ILLINOIS

Buckman, Benj., Farmingdale
Casper, O. H., Anna
Heide, John F. H., 500 Oakwood Blvd., Chicago
Illinois, University of, Urbana (Librarian)
Hon. W. A. Potter, Marion
Harry J. Rickelman, Weed Bldg., Effingham
Reihl, E. A., Godfrey, Route 2
Shaw, James B., Urbana, Box 143, Univ. Sta.
Swisher, S. L., Mulkeytown
Sundstrand, Mrs. G. D., 916 Garfield Ave., Rockford
Wells, Oscar, Farina

INDIANA

Crain, Donald J., 1313 North St., Logansport
Jackson, Francis M., 122 N. Main St., South Bend
Reed, W. C., Vincennes
Redmon, Felix, Rockport, R. R. 2, Box 32
Rowell, Mrs. George P., 219 North 5th St., Goshen
Simpson, H. D., Vincennes
Staderman, A. L., 120 South 7th St., Terre Haute
Wilkinson, J. F., Rockport

IOWA

Bricker, C. W., Ladora
Finnell, J. F. C., Hamburg
Pfeiffer, W. F., Fayette
Skromme, L. J. (Skromme Seed Company), Roland
Snyder, D. C., Center Point
Snyder, S. W., Center Point

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*Life Member.
†Honorary Member

KANSAS

Bishop, S. L., Conway Springs
Gray, Dr. Clyde, Horton
Sharpe, James, Council Grove

KENTUCKY

Baker, Sam C., Beaver Dam, R. D. No. 2
Livengood, Frank M., Boaz

MAINE

Leavitt, Mrs. Alice D., 79 High St., Brighton

MARYLAND

Auchter, E. C., College Park
Littlepage, Miss Louise, Bowie
Keenan, Dr. John F. Brentwood
O'Connor, P. J., Bowie

MASSACHUSETTS

*Bowditch, James H., 903 Tremont Bldg., Boston
Cleaver, C. Leroy, Hingham Center
Jackson, Arthur H., 63 Fayerweather St., Cambridge
Mass. Agriculture College, Library of, Amherst
Scudder, Dr. Charles L., 209 Beacon St., Boston

MICHIGAN

Beck, J. P., 25 James, Saginaw
Charles, Dr. Elmer, Pontiac
Cross, John L., 104 Division St., Bangor
Graves, Henry B., 2134 Dime Bank Bldg., Detroit
Guild, Stacy R., 562 So. 7th St., Ann Arbor
Hartig, G. F., Bridgeman, R. F. D. No. 1
Henshall, H., 527 Harper St., Detroit
House, George W., Ford Bldg., Detroit
Kellogg, Dr. J. H., Battle Creek, 202 Manchester St.
*Linton, W. S., Saginaw, Pres. Board of Trade
Mac Nab, Dr. Alex B., Cassopolis
McKale, H. B., Lansing, Route 6
Olson, A. E., Holton
Penny, Harvey A., Saginaw, 425 So. Jefferson Ave.
Smith, Edward J., 85 So. Union St., Battle Creek

MISSISSIPPI

Bechtel, Theo., Ocean Springs

MISSOURI

Crosby, Miss Jessie M., 4241 Harrison St., Kansas City
Hazen, Josiah J., (Neosho Nurseries Co.) Neosho
Rhodes, J. I., 224 Maple St., Neosho
Spellen, Howard P., 4505a W. Papin St., St. Louis
Stark, P. C., Louisiana

NEBRASKA

Caha, William, Wahoo
Thomas, Dr. W. A., Lincoln

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*Life Member.

NEW HAMPSHIRE

Stevens, Henry B., N. H. College of Agriculture, Durham

NEVADA

Swingle, C. G., Hazen

NEW JERSEY

Brown, Jacob S., Elmer, Salem Co.
*Jaques, Lee W., 74 Waverly St., Jersey City
Landmann, Miss M. V. Cranbury, R. D. No. 2
Marshall, S. L., Vineland
Marston, Edwin S., Florham Park, Box 72
Phillips, Irving S., 501 Madison St., West New York
Price, John R., 36 Ridgdale Ave., Madison
Ridgeway, C. S., Lumberton
Salvage, W. K., Farmingdale
Westcoat Wilmer, 230 Knight Ave., Collingswood

NEW YORK

Abbott, Frederick B., 1211 Tabor Court, Brooklyn
Adams, Sidney I., 418 Powers Bldg., Rochester
Ashworth, Fred L., Heuvelton
Babcock, H. J., Lockport
Bixby, Willard G., 32 Grand Ave., Baldwin, L. I
Borchers, H. Chas., Wenga Farm, Armonk
Brown, Ronold K., 320 Broadway, New York City
Buist, Dr. G. J., 3 Hancock St., Brooklyn
Clark, George H., 131 State St., Rochester
Crane, Alfred J., Monroe
Coriell, A. S., 120 Broadway, New York City
Diprose, Alfred H., 468 Clinton Ave., South, Rochester
Ellwanger, Mrs. W. D., 510 East Ave., Rochester
Gager, Dr. C. Stewart, Brooklyn Botanic Garden, Brooklyn
Gillet, Dr. Henry W., 140 W. 57th St., New York City
Goeltz, Mrs. M. H., 2524 Creston Ave., New York City
Graham, S. H., R. D. 5, Ithaca
Hall, L. W., Jr., 509 Cutler Bldg., Rochester (L. W. Hall Co., Inc.)
Harper, George W., Jr., 115 Broadway, New York City
Hodge, James, 199 Kingsbridge Road West, Kingsbridge, N. Y. C.
Hodgson, Casper W., Yonkers, (World Book Co.)
Hoffman, Arthur S., 26 Church St., White Plains
Kains, M. G., Pomona
Jewett, Edmund G., 16 Elliott Place, Brooklyn
Johnson, Harriet, M. B., 15th & 4th Ave., New York City
*Huntington, A. M., 15 W. 81st St., New York City
MacDaniel, S. H., Dept. of Pomology, New York State College of Agriculture, Ithaca
McGlennon, J. S., 528 Cutler Building, Rochester
Meyers, Charles, 316 Adelphi St., Brooklyn
Olcott, Ralph T. (Editor American Nut Journal), Ellwanger and Barry Building, Rochester
Pomeroy, A. C., Lockport
Richardson, J. M., 2 Columbus Circle, New York City
Ritchie, John W., Yonkers, 2 A Beach Street

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*Life Member.

Ryder, Clayton, Carmel
Stephen, John W., Syracuse, New York State College of Forestry
Solley, Dr. John B., 968 Lexington Ave., New York City
Teele, Arthur W., 120 Broadway, New York City
Vollertsen, Conrad, 375 Gregory St., Rochester
Wetmore, W. J., Elmira
Whitney, Arthur C., 9 Manila St., Rochester
Whitney, Leon F., 65 Barclay St., New York City
Wile, M. E., 955 Harvard St., Rochester
Williams, Dr. Chas. Mallory, 4 W. 50th St., New York City
*Wisman, Mrs. F. de R. Westchester, New York City

NORTH CAROLINA

Hutchings, Miss L. G., Pine Bluff
C. W. Mattews, North Carolina Dept. of Agriculture, Raleigh
Van Lindley, J., (J. Van Lindley Nursery Co.), Pomona

OHIO

Burton, J. Howard, Casstown
Dayton, J. H., (Storrs & Harrison), Painesville
Fickes, W. R., Wooster, R. No. 6
Jackson, A. V., 3275 Linwood Rd., Cincinnati
Ketchem, C. S., Middlefield Box 981
Pomerene Julius, 1914 East 116th St., Cleveland
Ramsey, John, 1803 Freeman Ave., Cincinnati
Truman, G. G., Perrysville, Box 167
*Weber, Harry R., Cincinnati, 123 East 6th St.
Yunck, Edward G., 706 Central Ave., Sandusky

OKLAHOMA

Beitmen, C. E., Dr., Skedee

OREGON

Marvin, Cornelia, Oregon State Library, Salem
Nelson, W. W., R. 3, Box 652, Portland
Pearcy, Knight, 210 Oregon Building, Salem

PENNSYLVANIA

Althouse, C. Scott, 820 North 5th St., Reading
Balthaser, James M., Wernersville, Berks Co.
Bohn, Dr. H. W., 34 No. 9th St., Reading
Bolton, Charles G., Zieglerville
Bomberger, John S., Lebanon, R. F. D. No. 1
Chapin, Irvin, Shickshinny
Clark,, D. F., 147 N. 13th St., Harrisburg
Druckemiller, W. H., Sunbury
Fagan, Prof. F. N., State College
Fritz, Ammon P., 35 E. Franklin St., Ephrata
Heffner, H., Leeper
Hess, Elam G., Manhein
Hile, Anthony, Curwensville
Irwin, Ernest C., 66 St. Nicholas Bldg., Pittsburg
Jenkins, Charles Francis, Philadelphia—Farm Journal
*Jones, J. F., Lancaster, Box 527

*Life Member.

Kaufman, M. M., Clarion
Leas, F. C., Merion Station
Mellor, Alfred, 152 W. Walnut Lane, Germantown, Philadelphia
Minick, C. G., Ridgway
Murphy, P. J., Scranton, Vice-Pres. L. & W. R. R. Co.
Myers, J. Everitt, R. D. No. 3, York Springs
Neagley, C. H., Greencastle, R. D. No. 2
Patterson, J. E., 77 North Franklin St., Wilkes Barre
*Rick, John, 438 Pennsylvania Square, Reading
Rittenhouse, Dr. J. F. S., Lorane
Robinson, W. I., Fort Loudon
Rose, William J., 413 Market St., Harrisburg "Personal"
Rush, J. G., West Willow
Russell, Dr. Andrew L., 729 Wabash Bldg., Pittsburgh
Shoemaker, H. C., 1739 Main St., Northampton
Smedley, Samuel L., Newton Square, R. F. D. No. 1
Smith Dr. J. Russell, Swarthmore
*Sober, C. K. Col., Lewisburg
Spencer, L. N., 216 East New St., Lancaster
Taylor, Lowndes, West Chester, Box 3, Route 1
Walter, R. G., Willow Grove, Doylestown Pike
Weaver, William S., McCungie
Wilhelm, Dr. Edward A., Clarion
*Wister, John C., Wister St. & Clarkson Ave., Germantown

SOUTH CAROLINA

Shanklin, A. G., Prof., Clemson College
Kendall, Dr. F. D., 1317 Hampton Ave., Columbus

TENNESSEE

Waite, J. W., Normandy

VERMONT

Aldrich, A. W., Springfield, R. F. D. No. 3
Holbrook, F. C., Battleboro

VIRGINIA

Harris, D. C., Capital Landing Road, Williamsburg
Jordan, J. H., Bohannon
Parrish, John S., Charlottesville, Route No. 4
Roper, W. N., Petersburg

WASHINGTON

Baines, William, Okanogan
Turk, Richard H., Washougal

WEST VIRGINIA

Brooks, Fred E., French Creek
Cannaday, Dr. J. E., Charleston, Box 693
Hartzel, B. F., Shepherdstown
Mish, A. F., Inwood

WISCONSIN

Lang, Robert B., Racine, Box 103
Patchen, Dr. G. W., Manitowoc

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*Life Member.

CONSTITUTION

ARTICLE I

Name. This society shall be known as the NORTHERN NUT GROWERS ASSOCIATION.

ARTICLE II

Object. Its object shall be the promotion of interest in nut-bearing plants, their products and their culture.

ARTICLE III

Membership. Membership in the society shall be open to all persons who desire to further nut culture, without reference to place of residence or nationality, subject to the rules and regulations of the committee on membership.

ARTICLE IV

Officers. There shall be a president, a vice-president, a secretary and a treasurer, who shall be elected by ballot at the annual meeting; and an executive committee of six persons, of which the president, the two last retiring presidents, the vice-president, the secretary and the treasurer shall be members. There shall be a state vice-presilent from each state, dependency, or country represented in the membership of the association, who shall be appointed by the president.

ARTICLE V

Election of Officers. A committee of five members shall be elected at the annual meeting for the purpose of nominating officers for the following year.

ARTICLE VI

Meetings. The place and time of the annual meeting shall be selected by the membership in session or, in the event of no selection being made at this time, the executive committee shall choose the place and time for the holding of the annual convention. Such other meetings as may seem desirable may be called by the president and executive committee.

ARTICLE VII

Quorum. Ten members of the association shall constitute a quorum, but must include two of the four elected officers.

ARTICLE VIII

Amendments. This constitution may be amended by a two-thirds vote of the members present at any annual meeting, notice of such amendment having been read at the previous annual meeting, or a copy of the proposed amendment having been mailed by any member to each member thirty days before the date of the annual meeting.

BY-LAWS

ARTICLE I

Committees. The association shall appoint standing committees as follows: On membership, on finance, on programme, on press and publication, on nomenclature, on promising seedlings, on hybrids, and an auditing committee. The committee on membership may make recommendations to the association as to the discipline or expulsion of any member.

ARTICLE II

Fees. Annual members shall pay two dollars annually, or three dollars and twenty-five cents, including a year's subscription to the American Nut Journal. Contributing members shall pay five dollars annually, this membership including a year's subscription to the American Nut Journal. Life members shall make one payment of fifty dollars, and shall be exempt from further dues. Honorary members shall be exempt from dues.

ARTICLE III

Membership. All annual memberships shall begin either with the first day of the calendar quarter following the date of joining the Association, or with the first day of the calendar quarter preceding that date as may be arranged between the new member and the Treasurer.

ARTACLE IV

Amendments. By-laws may be amended by a two-thirds vote of members present at any annual meeting.

PROCEEDINGS
AT THE
TWELFTH ANNUAL CONVENTION OF THE NORTHERN NUT GROWERS ASSOCIATION

LANCASTER, PA.

OCTOBER 6 AND 7, 1921

The Convention was called to order at 10 a. m. Thursday, October 6, 1921, by the President, Hon. William S. Linton, of Saginaw, Michigan, in the convention hall of the Brunswick Hotel, Lancaster, Pa.

THE PRESIDENT: It certainly is a pleasure and a privilege for us to meet in the prosperous and historic Pennsylvania City of Lancaster. I am sure that we will have a successful meeting, and I am certain also that during the past year progress has been made in our work which when read into the records will show that we have accomplished material good. Without further preliminary remarks, and with the statement that my address or report will come later during the session, we will proceed immediately with our programme.

I have the honor to call upon the representative of the Mayor of Lancaster, Oliver S. Schaeffer, for the welcoming address.

OLIVER S. SCHAEFFER, ESQ.: Mr. President, Members of the Northern Nut Growers' Association, Friends and Guests: On behalf of the Mayor and the people of Lancaster I extend to you their greetings and bid you a most hearty and cordial welcome.

We feel honored that you have selected for the second time this city for the holding of your convention. Your esteemed president referred to Lancaster City as an historic city, and no doubt all of you know that Lancaster is frequently called the garden spot of the world.

Historically Lancaster City was the capital of Pennsylvania for thirty-three years, I think from 1779 to 1812. During the Revolutionary War when the British troops occupied Philadelphia the Continental Congress met here for a while in a building that formerly stood at Center Square where you now see the Soldiers' and Sailors' Monument.

I was talking to your secretary a few minutes in the hotel lobby this morning and he told me that while some of you were in the nut business with a majority of you it was a hobby. That is the altruistic spirit that counts in these days when most of us look upon things in a materialistic way.

There was a time when I thought that most nuts came from Brazil, but I am glad to learn that we grow the nuts we eat here in the good old U. S. A., and some right here in Pennsylvania and in Lancaster County.

I cannot help but think of the chestnut blight that has worked havoc throughout our state and some other states. It has occasioned a big material loss. Yet I think too of another side of the loss and that is the spiritual side because our "chestnut parties" are now becoming a past memory. It is up to men like you to retrieve that loss and to bring back to our youth the chance of experiencing that innocent pleasure the gathering of chestnuts.

As I look into your faces here this morning (and while you are not numerous you make up in quality what you lack in quantity), I cannot help but congratulate you on showing the spirit that means progress. I cannot help but feel also that you are optimists, and they are what we need at the present time.

I will not trespass upon your time any longer. I again bid you a most warm welcome to our city and on behalf of the Mayor hand you the symbolic key of this city to enable you to go where you please.

The President: Working with us unselfishly for the past two or three years has been a Michigan man who has had in mind the benefit of his locality, the State of Michigan and the United States. It was his privilege to introduce the first bill into a state legislature that became a law making it obligatory upon state authorities to plant useful trees along the roadside throughout the entire state that he represented so well in the Senate. I take pleasure in calling upon that member to respond to the eloquent words of the Mayor's representative. I would ask Senator Penney to reply to Mr. Schaeffer.

Hon. Harvey A. Penney: Mr. Chairman and Gentlemen of this Convention, and Mr. Mayor: We all appreciate this warm and hospitable greeting. Some of us are a long way from home. Mr. Linton, and I come from a town somewhat the size of this. We have about sixty-five thousand people, a large and growing city with a lot of prosperous and very wealthy men in it. We feel that in coming here we are coming to a city something like our own. We have been very much impressed with your city since we have been here. I am glad to see that colonial spirit, the spirit of '76, which permeates your people here. Up in Saginaw, of course, we do not have the same things to remind us of the past that you have. You have your monuments and those things that call your attention continually to it; but I am sure that our poeple are as patriotic as your people. However, I think that the spirit of '76 which still permeates the East helps to keep the whole country in line for the patriotic upholding of our governmental institutions.

While most of the men here are interested especially in the scientific investigation and promotion of the nut industry, my friend Mr. Linton and I been more particularly interested in road-side planting. Along with the promotion and building of good highways we fell into the idea of beautifying those highways. At the time the people in the East were having their trouble in the colonial days, the revolutionary days, our town was unheard of. It was simply way back in the forest and the wilderness and it was not until very early in this past century that Saginaw was even thought of. Mr. Linton and I talked last night about different things connected with the history of our country and we spoke of De Tocqueville, the great French traveler and explorer who came to America way back in 1831. He wished to go into the wilds of this country and see for himself what was here. He went to Buffalo and crossed the lakes to Detroit. Detroit was then a city of about two thousand inhabitants. And then he had the desire to go up into the wilds where nothing but wild animals and wild people lived; so he went up on a trail that led to what is now Pontiac perhaps thirty or forty miles northwest of Saginaw; that was about the end of the trail. There were one or two settlers who lived there. He picked up a couple of Indian guides and started through the trackless forest, sixty or seventy miles up through the northwest to what is now Saginaw. He had his desire fully satisfied. He was eaten up by mosquitoes and rattlesnakes in the swamps and marshes; he could not sleep nor anything else; so he came back. That was away back in 1831, fifty years or more after your people were fighting and struggling for the liberty of this country.

I wish to say in closing that we all highly appreciate the welcome that has been extended to us on behalf of the Mayor of this fine city.

The President: Next on the program will come the report of the secretary.

The Secretary: I regret the smallness of the secretary's accomplishment for the past year. Except for the editing of the annual report—which is much a matter of cutting out superfluous words—and the effort to get speakers for this convention, he has attempted very little.

This is not, however, for lack of things that could and should have been done. An energetic campaign for new members is the most obvious desideratum. The committee to prepare and issue a bulletin on the roadside planting of nut trees, arranged to give information for every part of the country, has been innocuous as well as useless. Perhaps this meeting will afford stimulus and material enough to get it to work.

I think that few of the members realize how the inactivity of the secretary has been more than made up for by the industry of the treasurer. Perhaps they are reciprocally cause and consequence. Not only has the treasurer discharged the usual duties of that office but he has also attended to most of the correspondence and clerical work. He has conducted the nut contests which, under his management, have developed to formidable proportions requiring immense expenditure of time and effort.

These nut contests have now become so widely known as to return us a good idea of what we may expect of the native nuts of the country. Undoubtedly we have not yet found the best nuts that this country produces, except perhaps in the case of the pecan. But Mr. Bixby's labors, continuing the work begun by Dr. Morris, have reached such results that I think he will be willing to say that we have nearly reached the limit of natural excellence in the nuts already discovered.

In fact it seems to me that we have reached the point where further improvement in nuts for cultivation is to be looked for especially from purposeful hybridizing by man. It should be another of the chief aims of this association to induce self-perpetuating institutions to get together the material necessary for such work. Such material already exists in incomplete form—incomplete, that is, especially in horticultural varieties—as in the Arnold Arboretum and in the Public Park at Rochester. The Arnold Arboretum, through our treasurer's efforts, has agreed to give more attention to nut growing and breeding. The St. Louis Botanical Garden and the Brooklyn Botanical Garden, through the efforts and generosity of Mr. Bixby and Mr. Jones, have made special plantings of horticultural varieties, and this summer the New York Botanical Garden was induced to set out a number of grafted and seedling nut trees given by Mr. Jones. Mr. Bixby. Mr. W. C. Reed, the McCoy Nut Nurseries and others.

But unless this association can keep their interest alive it is likely that some of these institutional plantings will be neglected, especially as regards the highest development of their possibilities. In one botanical garden visited this summer the casual nut tree plantings running back thirty years have been entirely neglected and the trees are stunted almost to extinction. I hope that our members will lose no opportunity to visit these institutions and ask to see the nut tree plantings. One or two such visits in a year will help to keep our wards in the institutional mind.

We cannot expect from these gardens, at present at least, interest in breeding experiments. That is more properly a function of agricultural experiment stations. These are so short manned and short funded, so absorbed in problems offering quicker results, that it is difficult to get them even to consider nut growing. I do not recall a single experiment station in the country where any nut breeding experiments are being conducted. A few manifest a little interest in planting horticultural varieties but the only breeding experiments that I know of, or at this moment recall, are those of Dr. Morris, Dr. Van Fleet, Mr. Forkert and Mr. Jones. All of these experimenters have produced results that more than indicate great possibilities.

Therefore I think that more of the energy of this association should be expended in influencing the self perpetuating horticultural institutions to see the importance of nut culture.

Attention should be called also to our treasurer's initiative, perseverance and industry in issuing Bulletin No. 5 on Nut Culture, in improving and reprinting our accredited list of nut nurserymen, in visiting, photographing and describing many of our important parent nut trees, in securing and distributing scions, in promoting experimental topworking of native nut trees in promising localities, in developing a varietal and experimental nut orchard which in time will be second to none in these respects, and in many other promotions of the objects of our association, unsparingly of his energy and his means.

It is curious that the biggest development in nut tree planting, for which we are responsible apparently, and practically the only considerable development of the roadside planting of nut trees, about which we have been talking so much, is on the other side of the earth, in China, where Mr. Wang, one of our members, and associated with the Kinsan Arboretum, is planting along the new model highway from Shanghai to Hangkow, a ton of black walnuts bought in this country and shipped to him through Mr. Bixby.

Two public horticultural institutions in Canada have written me about making nut plantings.

We seem, perhaps, in this land, too busy making what we call wealth, and armaments to protect it, too busy to give attention to the food supply of the future race.

To summarise, the association may feel that its purpose as originally stated, and never changed, "The Promotion of Interest in Nut Bearing Plants, their Products and their Culture," has been furthered consistently though results are slow. For the future we should work, 1. For a greater membership. 2. To stimulate interest in horticultural institutions, especially in nut breeding. 3. To give definite information that will encourage nut tree planting for profit by individuals. 4. To promote roadside, memorial and public place planting of nut trees. 5. To discover still more of our valuable native nut trees through our prize contests.

Mr. C. A. Reed has made a suggestion which I will lay before you and which may be considered at a later hour. He suggests that it might be better to have our conventions once in two years, every other one to be held in Washington.

This is so radical a proposal that it should have prolonged consideration before adoption.

The affairs of the association are not getting from the secretary the attention they deserve and he does not foresee better attention in the future. He wishes that some more active person could be found for the place and would be very glad to have the association elect another secretary.

THE PRESIDENT: The secretary's report will be received and filed with the proceedings. Are there any remarks in connection therewith?

Personally, I wish to endorse emphatically what the secretary has said relative to Treasurer Bixby who has worked early and late and has promoted the affairs of this association to a very great degree. His work is along practical lines and brings results.

The secretary finds fault with himself. No member of the association endorses that particular phase of his paper because his work has been good, he has had the best interests of the association at heart at all times that I personally know—and I sincerely hope that he may change his mind relative to his successor.

We will now listen to the report of Treasurer Bixby.

NORTHERN NUT GROWERS ASSOCIATION
In account with
WILLARD G. BIXBY, TREASURER

RECEIPTS

Balance on hand Oct. 1, 1921:				
Special Hickory Price, $25.00; Life Membership, $25.00; for Regular Expenses, $25.26				$ 75.26
From Annual members including joint subscriptions to American Nut Journal	$ 199.50	$ 423.58	$ 623.08	
Reports	5.50	7.50	13.00	
Contribution for prizes	54.00	15.00	69.00	
Contribution to meet expenses		602.50	602.50	
Bulletin No. 5	12.73	60.94	73.67	
Cash discount on bills paid	.48		.48	
Postage returned		.10	.10	
Advertising in Report		5.00	5.00	
Life Membership P. W. Wang		20.00	20.00	
Funds Received for transmission to other parties		1.00	1.00	
Salary check returned by Secretary		50.00	50.00	
	$ 272.21	$1,185.62	$1,457.83	$1,457.83
Deficit October 1, 1921:				
Balance Special Hickory prize	$ 25.00			
Life Membership	45.00			
Deficit for regular expenses	* 246.07			176.07
Net deficit				1,709.16

EXPENDITURES

American Nut Journal, their portion of joint subscriptions '	$ 64.00	$ 199.65	$ 263.65	
1920 Convention	85.00		85.00	
Printing Bulletin No. 5		62.50	62.50	
Stationery, Printing & Supplies	50.55	91.01	141.56	
Postage, Express, etc.	36.60	75.78	112.38	
Prizes 1919 Nut Contest	128.00		128.00	
Advertising 1920 Nut Contest	52.08		52.08	
Printing Report 10th Meeting	69.09	400.05	469.14	
Printing Report 11th Meeting		341.85	341.85	
Funds received for Transmission to other parties		3.00	3.00	
Salary Secretary	50.00		50.00	
	$ 535.32	$1,173.84	$1,709.16	$1,709.16

*At the meeting on the morning of October 7th this deficit was wiped out by $250.00 being subscribed by the members present for this purpose.

Forty-seven new members have joined the Association since the last report, making 523 since organization, of which we have 221, making 302 who have resigned or otherwise dropped out. It will be noticed that the number of members received last year, 47, is less than the number reported a year ago, 66. This in the judgment of the Treasurer is entirely due to the less amount of energy expended for a smaller proportion of members have dropped out than a year ago. While the gaining of members is not particularly easy it can be done and the number gained to quite an extent is in proportion to the energy put on it.

The finances of the Association this year are in a more troublesome situation than any year since the undersigned had charge. Two reports each at double normal cost each is quite enough to cause it. An inspection of the Treasurer's accounts have made it evident that during no year in the history of the Association have the dues received been equal to the cost of carrying on the Association. Each year some members interested have contributed in addition to paying dues. During the year past these sums have been considerable. It is believed that with only one report a year there will be only normal difficulty in handling the finances of the Association. The orderly conduct of the finances of the Association makes it very desirable that normal receipts of dues take care of normal expenditures with a little margin for contingencies. The matter of classes of membership would seemingly help on this. The treasurer would not recommend changing the annual membership from its present figures, $2.00, but would suggest that this meeting consider making a class of contributing members at $5.00 per year including the American Nut Journal. This would give the Association double the income from each such member that it now gets for most members accept the combination offer of membership in the Association and subscription to the American Nut Journal at $3.25 for both which nets the Association $1.75 per year.

Respectfully submitted,

Sept. 30, 1921. WILLARD G. BIXBY.

THE PRESIDENT: Mr. Bixby is certainly a first class treasurer. He makes a recommendation in his report. Do you desire to act upon it at this time? I refer to his recommendation relative to a new class of membership. It is a first class suggestion and a motion covering it would be in order.

THE SECRETARY: I move that a committee of three be appointed by the president to consider the recommendation of the treasurer relative to different classes of membership and to report at this meeting.

Mr. A. C. Pomeroy: I second the motion.

The motion was carried.

The President: I will appoint as that committee the treasurer, Mr. Bixby, the secretary, Dr. Deming, and Mr. R. T. Olcott.

Mr. Reed, the chairman of the committee on road-side planting, is in California, and unable to be with us at this session. If a report is to come from that committee it must necessarily come from some other member, so we will defer action on that particular report at this time.

We also regret the absence of Dr. Morris the first president of the association. He is unable to be with us at this meeting but he has forwarded a paper and unless there are objections we will receive it at this time and have it read by the secretary.

NUT TREES FOR PUBLIC PLACES

Dr. Robert T. Morris, New York

The question of the planting of nut trees along highways and in parks and other public grounds falls into classification under two separate and distinct heads. First, the abstract proposition of planting useful trees upon ground which is not usefully occupied otherwise. Second, the reaction of human nature to the different phases of the proposition. The latter part is the larger part of the question, otherwise the work would already have been done.

Let us take up the smaller part of the question first. Nut trees which are indigenous to any locality, or allied species from other countries having similar soil and climatic conditions, will grow and thrive on public grounds quite as well as upon private property. They will be as beautiful and as useful upon public grounds as they are upon private property, speaking in a large way, although disposal of their products will go along different channels perhaps. Nut trees of various species will be quite as beautiful and distinctly more useful than any of the other trees that are commonly selected for planting upon public grounds. Because of the inclusion of the economic factor the question as to whether nut trees may well supplant the kinds of trees commonly selected is not a debatable question.

Let us leave this part of the subject however and take up question number two, relating to the human nature side. A little examination into this phase of the matter will disclose reasons why nut trees are not already along our highways and in parks and other public grounds. The supplying of trees on a large scale for such a purpose is commonly done by contract with nurserymen. Nurserymen find it more profitable to raise certain kinds of trees instead of other kinds. Nurserymen are prone to raise kinds which are most profitable. Public officials who are making contracts sometimes look for perquisites. These include acceptance from nurserymen of bonuses for letting the contract. Here then we have at the very outset of the problem two large obstacles to the purchase of nut trees for public places. The carrying forward of any large project of this sort means reliance upon someone with legislative resources. In my experience legislators are commonly keen to approve of any project which will render public service when they are fully convinced of that fact. If not fully convinced of that fact and reserving the feeling that private interests are being served they wait until somebody who knows how to see the legislator has seen him. Another phase of the question relates to the attitude of the people toward public property in a so-called free country. People are prone to take anything that they please from anything which is so impersonal as a country. Nut trees planted in public places would have their crops carried off by every passer by to such anexte nt that revenue for the upkeep of the trees would be difficult to obtain. In some of the European countries this obstacle has not been insurmountable. There are many villages in Europe in which privately owned fields are not even fenced and fruit and nut trees growing for the benefit of the village are left untouched by the passer by in this older civilization. A man would no more think of taking what belonged to the town than he would think of taking property from the storehouse of a neighbor. In this country we have not yet arrived at that point in civilization. The distinction between *meum* and *tuum* in a free country is sometimes blurred.

What are we to do about this whole question? That is the practical point. Change human nature and educate the public. In towns belonging to our system of government there is some question if the public would ever allow nut trees to bring revenue sufficient for their upkeep and to yield a profit for the town. On the other hand, by means of education the public may come to desire the planting of nut trees along the highways and in other public places to the extent that it will submit to taxation for the purpose. The public planting of nut trees belongs to progress. If we are to remain boastful of progress in this country the question will gradually be developed in a practical way.

The President: You have heard the reading of Dr. Morris's paper. Are there any remarks thereon or any discussion?

Mr. A. C. Pomeroy: Some years ago there was objection raised at Los Angeles to the use of sewage water for irrigating purposes in raising tomatoes and other vegetables. The city then bought the property and set out orchards of English walnuts. I understand that they are growing and that the revenue goes to the city of Los Angeles.

As to the road-side planting of nut trees in Europe, to which Dr. Morris refers, the very first battle fought in the great world war when the Belgians were resisting the Germans was along where there were thirty miles of English walnut trees on both sides of a highway. I understood that every tree was demolished. I think our secretary or treasurer could find out about the Los Angeles park and the nut trees.

As to monument trees, about twelve or fifteen years ago, at my home, I set out a grove in our cemetery in memory of my father and it is doing fine. It seemed quite appropriate for he took such an interest in nut growing.

The Secretary: I would like to speak a word in defense of our American civilization, as evidenced by something that Mr. Bixby and I saw this summer at Lockport, New York. We observed that one of the main highways leading from the town of Lockport to one of the principal lakeside resorts, was unfenced, lined with fruit trees on both sides—cherry trees which overhung the sidewalk. The sides of the road also were planted with tomatoes and other vegetables apparently unharmed. The trees certainly did not show any evidence of injury from depredations. Whether the products of the trees were taken or not I do not know but they still had fruit on them. Possibly those who live in that neighborhood—Mr. Olcott and Mr. Pomeroy—could tell us more in defense of American civilization as to depredations on road-side property.

Mr. Pomeroy: There are some people—what do you call them—dung hills—in this world, and I have had a little trouble with them but not much. They ran around in automobiles and get out and take fruit. Dr. Deming and Mr. Olcott know how close the school house is to my home. The fact is the children walk under the nut trees when they take the cut through the private driveway, but I have very little trouble with them. I think the greatest object lesson was given last year, when two young men, who were hunting pheasants, took a half bushel of nuts and were caught at it. They did not think it amounted to anything. They came along up to the house and the nuts were taken and put upon the drying rack. While they were arguing an automobile stopped and the nuts were sold. They came to nine dollars and a few cents by the pound. One of these young men—he was in the retail tobacco business,—threw up his hands and said, "I admit it; I would not want you to walk into my store and grab nine or ten dollars' worth of goods; I admit this is all wrong."

Mr. R. T. Olcott: I have been very much surprised in the discussion of road-side planting, of fruit and nut trees at the prominence given to that feature of it which deals with the public taking the crop. That seems to me to be such a minor part of the proposition as to be almost negligible, and while it continues to arouse discussion I cannot see the vital importance of it. In a great many undertakings there are drawbacks but the undertakings go right on and when the difficulties arise they are met in turn. I think the thing for this association, and all others in favor of road-side tree planting to do is to go ahead with the proposition and forget the question of the crop and what is going to be done with it. As a matter of fact farmers are complaining continually of the depredations on their orchards resulting from the increase of automobile parties—perfectly respectable people going out on the road-side and helping themselves. If fine fruit and nut trees were planted along the road-sides and the crops were being picked, it seems to me that, under a general understanding that the public was to let these trees alone, and that any one caught or seen picking the crops would be reported by the one following, it would automatically police itself. The finger of ridicule would be pointed at a person who was so doing by somebody other than a uniformed officer, in other words by an ordinaray citizen. I speak of that because in Rochester during the war when it was deemed necessary not to run automobiles on Sunday it was as much as his life was worth for a man to be out with his car on Sunday, not because of any police officer but because of the other fellow who was staying at home. I think that the other travelers along the road will take care of the fellow that violates the understanding about roadside fruit and nut trees.

The Vice-President: I come from Rochester, New York, and I know that in and around Rochester there are fruit-bearing trees planted along the roadside. Out on the road to Honeoye Falls there are a number of apple trees and out through the Webster section there are a number of cherry trees. I do not know what the results have been in the garnering of crops, but the appearance of the trees indicates that they are well cared for and that they are producing abundant crops of fruit. In Albany, Georgia, planted on the street side in front of the court house, are a number of pecan trees. I have seen them loaded to capacity with splendid seedling nuts. I understand that any one walking along the sidewalk under the trees has the right to pick up any nuts that are on the walk but is not permitted (at least it has been suggested that he do not) to reach up into the trees to take the nuts. I understand that the request has been very faithfully regarded and that it is very rare that the nuts are picked from the trees. Just what is done with the crop of nuts from those trees I do not know but I assume that it is harvested and marketed and the returns made to the town. The trees indicate that they are splendidly cared for and the citizens take a great deal of pride in their splendid appearance. I talked with the man who planted them, an employee of the court house, and he himself was simply delighted that he had been responsible for such a splendid monument. And property owners referred to in my home section, before whose premises these cherry trees and apple trees were planted, I feel very sure would not complain at all bitterly, if at all, about any filching that might be indulged in. So that I think, as Mr. Olcott has suggested, that maybe we are trying to cross the bridge before we get to it: that the thing to do is to urge the planting of nut trees on the roadsides and to stimulate a sense of pride in our American citizenship.

Mr. Olcott: We all agree that trees of this kind planted along the sides of city streets would never be touched. I have been at Miami, Florida, and have seen the bearing coconut trees there. No one would think of knocking off one of those coconuts and thousands of people pass under them.

The Secretary: I think it is very important to have brought out this optimistic view on the question of depredations on road-side fruit trees. I think it is only a question of time, as Mr. Olcott says, when the public will be educated to respect such products. If they have done it in other countries we can do it in this country. It is a question of the people becoming accustomed to it when we have enough of such products. When the whole country is covered with such products I think there will be no difficulty about maintaining respect for them. You know that sometimes after the loss of a very small amount of property there will be very great reaction. Some people feel that because robins take a few cherries or strawberries all robins ought to be exterminated.

There are two other remarks in Dr. Morris's paper which should have consideration. I refer to those bearing upon nurserymen and public officials.

Mr. Olcott: If there is any question relating to nurserymen, we are very fortunate in having one of the most prominent nurserymen in the United States at our meeting today. I refer to Mr. John Watson, of Princeton, New Jersey.

The President: We certainly would be glad to hear from Mr. Watson. If I may be permitted to make a statement from the chair I agree fully with what Mr. Olcott has had to say as to depredations. Possible depredations in connection with the trees that may be planted along the road-side, either fruit or nut, are hardly worthy of consideration. With my good wife in passing through New York State recently I drove through rows of fruit trees on either side of the roads, as did Dr. Deming and Treasurer Bixby, and we were surprised to see that they were loaded with apples. The fact that the trees were loaded with fruit of course proved that the fruit had not been stolen or taken from the trees. They had not been disturbed in any way. A number of years ago while holding the position of postmaster in Saginaw I planted a black walnut. That walnut has produced a fine walnut tree. I selected a nice place on the post office grounds at a corner where two of our prominent streets meet in the business portion of the city. Last fall for the first time that tree bore walnuts—about a bushel and a half; and the employees of the postoffice gathered those walnuts and sent them in a complimentary way to me. Now that tree being in a public place, you would naturally expect the boys to have taken the nuts from it, but they did not do it. So that I know that that particular phase of this question as Mr. Olcott has said is hardly worthy of consideration. Suppose now and then the boys do get a few fallen walnuts or apples. No harm is done. Just that much more food is produced for their benefit by this way of planting.

I now take pleasure in calling upon Mr. Watson relative to Dr. Morris's reference to the nursery business.

Mr. John Watson: I am afraid that Mr. Olcott's suggestion might possibly have given you the idea that I have something to say on this question or that I wanted to say something on it. I assure you that that is not the case. I am not a member of your association much to my regret. I am just visiting here trying to learn something from your meeting (this is the first one that I have attended) rather than to try to tell you something.

The question is whether I have any objection to make to Dr. Morris's two statements. I can say that they are both very reasonable. As a nurseryman I have no objection. Of course, I cannot speak for any other nurseryman.

I was rather surprised upon looking at the roll of those in attendance at this convention at the absence of nurserymen. I should think that those who produced the things that you people are trying to interest the country in would be the very men who would be the most interested in being here. It seems to me that you are trying to make a market for the goods that they are producing. I am rather surprised not to see at least half the attendance here made up of nurserymen.

It is entirely possible that I have not have understood those two statements made by Dr. Morris and I may be rather careless in saying that I do not object to them. They were, I believe, that nurserymen prefer, naturally, to produce the things that they can produce most easily and at least cost, and in the second place that they produce the things that they can sell. That is what most manufacturers do. I could not find fault with either statement. The nurseryman as a manufacturer or as a merchant of course produces the things that people want to buy. He may go a certain distance in producing the things that are worth while, that are better than other things; but in the last analysis he must depend upon the buying public and the buying public is always going to get from the nurseryman just exactly what it demands.

The Secretary: In regard to the presence of so few nurserymen at our meetings I would like to say that we have long tried to interest the nurserymen in nut growing. We always have had a few nurserymen with us; but I think without exception they have been those who had either previously become interested in nut growing or had become interested in it through some other influence than that of this association. It has been a great disappointment to us that we have never been able to interest the nurserymen generally. Although we have at times sent special communications to a great many nurserymen I think we have universally failed to get any response except from those who were already interested in nut growing.

The President: I do not think there is a movement in the country today that will amount to as much for the nurserymen of America as this particular movement that we have been promoting for a few years back. I know that it is becoming universal. During my short experience as your president I have found that inquiries have come from all over the United States asking how they may procure these trees and especially asking how they may procure the finest varieties. It is along that particular line that the nurserymen certainly could extend their business greatly; because as this movement of road-side planting goes along the man who has a good farm, the general farmer in his business, or any man with a small piece of ground that he can call his own, will want to plant a good nut tree thereon of a most improved variety. Now so many of these trees will be called for in the next few years (I do not think I am over-optimistic in the matter at all) that it will be impossible to supply the demand. So I am sure that any man who is regularly engaged in the nursery business will find that he will be called upon to supply a demand for the better class of trees that really cannot be filled for years to come. In this way his business will be largely benefited. Are there any further remarks on this particular phase of the question?

Mr. Olcott: As editor of the American Nurseryman I am especially interested in this discussion. There is scarcely a catalogue of a southern nurseryman of any consequence but lists nut trees; and yet we have the Northern Nut Growers' Association convention here now, and we will have a National convention in Mobile next week right in the heart of the pecan growing section at neither of which will there be a half dozen nurserymen. I think both of these associations should have more nurserymen members. They list nut trees but do it in a perfunctory way. I do not believe nurserymen know what this northern association is doing nor how near they are to the demand for the trees which will be wanted in the very near future. I think it is up to this association to make special efforts to acquaint them with the facts, and then I think they will come in and be active members. All persons connected with nut culture and all nurserymen ought to be most active members of such an organization as this. The subject should go before the membership committee.

Mr. Samuel L. Smedley: I have had a little experience with black walnuts and have found that they do not mix at all with farm crops nor with fruit. Possibly you folks from Michigan can solve the problem but I would not thank anybody for planting black walnuts along the road in front of my place. I am in favor of road-side planting but I do not think black walnuts would be acceptable in this part of the country, from what my experience has been.

The Treasurer: Let me ask why it is you think they would not be acceptable.

Mr. Smedley: I had a grand big walnut tree on my place at one side of the road. I tried to get apple trees to grow on the opposite side of the road but could not and it could not be accounted for by any other reason. I know other people have come to the some conclusion that certain things would not grow near a walnut tree. Some grasses will. If you go down through Lancaster County along the Lincoln Highway you will find a quantity of locust trees thriving there. Wheat and things will grow right up to the roots of those trees, but I do not think you will find that they will grow up to a black walnut.

The Treasurer: I had a chance to observe, last summer, a black walnut tree out in the field with a crop planted right under it. It seems to me it is a question of shade. With this walnut tree with branches low down the corn seemed to be stunted where it grew a little way under the branches. On the other hand I saw another one where the branches were high up and cabbages growing almost up to the tree and about as luxuriantly as outside of its branches. It seems to me that it is a matter of shade rather than the tree getting the fertility in the ground. It may be that if the fertility in the ground is not sufficient for both tree and crop the tree will take it and let the crop suffer. But I imagine if there is enough for both, and the crop is not shaded, the crop can be grown much nearer the tree than we have any idea of.

Mr. J. G. Rush: I want to say a word about this way-side planting in our neighborhood. I do not think it is the general practice in Lancaster County where land is valued at two or three hundred dollars an acre. If you plant a walnut tree on a public thoroughfare there is temptation for children to go there to gather walnuts, endangering their lives on account of the automobiles.

One gentleman said something about a walnut tree damaging the crops. In my experience with black walnut nursery trees some have what is called a very strong top root while others have a deep root. It is the first kind, the surface rooted, that will do your crop damage but not the deep-rooted kind.

Now another thing. Suppose one plants a cherry tree. To whom do the cherries belong? To the man who planted the tree practically on his premises. But the limbs extend out on the public highway. If I, the owner, take a ladder out there and pick cherries and an automobile comes running past and throws me down I am practically a trespasser on the public highway. I believe I would not plant along the public highway with the idea of gettitng any fruit from the trees. I think however when you have a railroad going through your premises it is entirely practicable to plant your nut trees alongside the railroad, especially where there is a fill. Where the roots will grow under it and thrive luxuriantly. Nearly every farmer has a small stream running through his premises. You plant your walnut trees or your filbert trees along that stream, and you will have magnificent results. I do not want to be understood as disparaging nut tree planting.

Mr. D. F. Clark: I would like to know if the planting of black walnut trees is discriminated against because of the difficulty of getting the meat out of the nut. I have made a great many experiments and have not been able to get the meat out of the nut in large pieces. Is there some kind of a machine made for that purpose? Black walnut kernels bring a splendid price and if we could get them open right it would be fine.

The Secretary: That difficulty is being taken care of by the improved varieties which are being raised and which you can get on grafted trees.

I am inclined to agree with Mr. Bixby in regard to its being the shade of black walnut trees that affects the crops growing near them rather than the roots of the trees. I have seen the same thing that Mr. Bixby describes, a high-pruned black walnut tree with wheat growing clear up to the trunk. I have photographs of a number of fields in Europe where the English walnut is grown. The trees are pruned high and the wheat grows up close to the trunks of the trees.

I would like to say also that I think it is the purpose of those who advocate the road-side planting of trees not to do it forcibly nor to compel anybody to have trees planted in front of his premises if he does not want them, but to give him a voice in the selection of the kind of trees that should be planted in front of his property. I think that is a necessary thing for the success of the movement, that the co-operation of the property owners should be invited by giving them a voice in the selection of the trees that are planted in their location.

DR. RITTENHOUSE: I feel that this matter of the injury caused by a black walnut to surrounding vegetation should be more thoroughly thrashed out. It is doubtful to my mind whether the injury that a black walnut produces on surrounding vegetation is solely due to shade. Seven years ago I planted an apple orchard and some of the young trees began to be injured by a large walnut tree possibly seventy five feet away. The walnut tree happened to be on the line and I got the permission of my neighbor to cut the walnut tree down. The apple trees immediately began to thrive. I thought perhaps it was due to the roots demanding too much moisture from the soil because it was impossible for the shade to do any harm to those young apple trees. There is a superstitious idea among the people of our locality that the black walnut root is injurious to growing vegetation.

MR. SMEDLEY: In my case the walnut tree was on the opposite side of a public road thirty feet wide and the influence was shown to the second row of apple trees on the other side. I do not think it was the shade in that case. The limbs were pretty high too. It was a public road. I do not think there were any roots that reached the apple trees at all.

MR. McGLENNON: Mr. Rush's reference to the ownership of the crop on trees planted on the road-side is a thought that has occupied my mind, and I have found some consolation in the belief that the ownership of land applies from the center of the roadway. I am not sure about that and I think it is a point that ought to be clarified.

MR. SMEDLEY: I think in Pennsylvania the public just have the right-of-way there; they have no claim to anything that grows.

THE PRESIDENT: In Michigan, the law applies that the ownership goes to the middle of the highway. The recent act of the legislature of our state causes the state highway commissioner to plant trees for the maintenance of the roadway. The planting of the trees he claims benefits the roadway, so that under that application he plants the trees for the maintenance of the road. The distance from the fence line varies. The state highway department of Michigan has a department for the planting of trees since the law introduced by Senator Penney some two or three years ago came into effect. The commissioner varies his planting, sometimes in groups and sometimes in a formal way, according to the stretch of road; but the basis of it all, perhaps, would be thirteen feet from the lot line on each side of the road. Our roads, or at least ninety per cent of them, are sixty-six feet in width. Thirteen feet from the lot line on each side would take twenty-six feet, and planting them forty feet apart in the other direction makes those trees forty feet apart each way. A great majority of the trees being planted in Michigan follow that particular plan, so they are thirteen feet from the property holder's fence line.

I might say that occasionally the highway commissioner would run across an obstinate individual who would not plant trees in front of his place nor permit such trees to be planted as would conform to the other plantings. But the law passed at the last session of our legislature leaves it entirely in the control of the planting department of the highway department. The law reads that the owner of the adjacent property shall have the privilege of gathering the fruit or nuts or whatever may come from that tree. He has no better right, perhaps, than any other citizen of the State of Michigan, but he is there and can get the first ripe fruit or nuts which come from the tree.

The President: Are there any further remarks upon this subject? If not, I have a paper prepared by Prof. A. K. Chittendon, Professor of Forestry in the Michigan Agricultural College, which I will ask the secretary to read.

ROADSIDE PLANTING

Prof. A. K. Chittendon

The improvement and beautification of our highways is one of the best investments that can be made. Particularly in the Middle West where we do not have the panorama of hills and mountains, much of the beauty of the road depends upon the roadside trees. They frame the long vistas of farmlands, woods, lakes and rivers and lend enchantment to the road. Under recent legislation Michigan has taken a leading place in the care and planting of roadside trees. Provision has been made by the Legislature for the planting of ornamental and food-producing trees along the highways and for their protection.

The highways offer an almost limitless field for ornamental planting and they also offer opportunities for raising certain food producing trees of which at present the nut trees are the principal species used. A time may come when we can safely plant fruit trees along the roadside but until provisions can be made for their systematic care and spraying, such trees would be liable to spread disease to nearby orchards.

Roadside trees increase the value of adjacent property. They attract birds and thus assist in keeping down insect pests. They may be used to prevent erosion on steep slopes. They increase the life of certain kinds of improved highways by protecting the roadbed from the direct heat of the sun. They serve as a source of food if nut-bearing or sugar-producing trees are used. They invite tourists to travel over the highways. They may serve as a windbreak to prevent the drifting of sand.

Roadside trees may, however, be too close together or by their shade injure crop production in adjacent fields. Some species of trees are particularly harmful if planted on the edge of a cultivated field. They send out their roots under the cultivated land and sap the moisture essential to plant growth. This can be avoided by using trees with deep or compact root systems.

The desirability of planting trees of any sort along the highways is sometimes questioned. There are places where it is urged that trees are not desirable. On stretches of road where the soil is naturally wet the heavy shade cast by certain species of trees is undoubtedly objectionable; but there are also trees whose shade is very light. Some trees make such a dense mass of foliage that they tend to prevent air currents and thus keep the moisture in the road from drying out. Along such stretches of road the method of planting may affect the matter of light and air, and species of trees can be chosen which will be practically unobjectionable. Most of the highway planting in the past has been a matter of chance and there have been few definite plans for any long stretch of roadway.

In selecting trees for planting the probable rate of growth and appearance of the tree at maturity should be borne in mind. What might seem entirely satisfactory in young trees may prove objectionable in the cost of mature ones. The size and shape of the tree at maturity should be considered as it affects the spacing of the trees. Also the amount of care which it will be possible to give the trees should influence the choice of species; for certain trees will product good results with a small amount of attention while others require a great deal of care. The matter of interference with telephone and electric wires must also be considered. A species should be selected which is relatively free from the attacks of insects and fungi. It would be very difficult to find a tree which is entirely immune but there are some trees which are more resistant than others. The amount of shade cast by the tree is of a great deal of importance in connection with the moisture conditions; trees are often placed too close together which prevents their proper development. Where quick results are desired two species are often used, a fast growing one planted in between slower growing trees: the idea being to cut out the fast growing tree after the slower growing ones have reached good size. This is alright in theory but seldom works well in practice. The fast growing trees are seldom cut at the proper time and the result is often the stunting and injuring of the better and more durable trees. The fast growing trees usually die before many years. The result is seldom satisfactory.

The question of litter while of importance with city street trees does not matter so much in the case of highway trees, but the cottony seed from poplars is very objectionable anywhere. The longevity of a tree is important. The desire for quick results often outweighs other considerations. Many of the trees which give results such as silver maple, box elder and Carolina poplar do not last long and the effort spent on them is wasted. More time and money is needed within a short time to remove and replace such trees. It is better to plant well in the first place. Trees do not grow at the same rate throughout their life. They usually grow slowly at first and then fairly rapidly between the tenth and thirteenth years, after which the rate of growth usually falls off gradually. If small trees, about ten feet high are used for planting they should reach the following sizes in twenty years on favorable soil:

American elm	18	inches
Basswood	15	"
Chestnut	12	"
Hard maple	11	"
Red oak	11	"
Pin oak	9	"
White ash	9	"
Black walnut	8	"
Hackberry	7	"

Certain trees such as the horse chestnut and the evergreens generally appear to better advantage alone or in groups while others like the elms, maples and box elder show to fine advantage in long rows. It is doubtful if the planting of windbreaks along the highways is advisable. Windbreaks are sometimes planted with the idea of preventing the drifting of snow but the snow will collect and form great drifts on the leeward side of a windbreak and the shade from the windbreak may prevent the snow from melting so rapidly. Hedges may be used, however, to prevent the shifting of sand or the erosion of steep slopes.

The highways offer excellent opportunities for nut production and such trees as the black walnut and hickories may often be used to advantage. The presence of birds may be encouraged by planting hackberry and other trees or shrubs of which they are fond.

The Michigan Agricultural College was authorized by the Legislature to raise trees for roadside planting. The College is raising red oak, black walnut, oriental sycamore, sugar maple, elm, hackberry, snowdrop tree, Juneberry, hickory, European larch, Norway maple and box elder for this purpose. Other trees may be added to the list from time to time.

In addition to the planting of trees we need also the proper care of those already planted or growing naturally along the roads. The commonest source of injury is due to improper pruning for telephone lines. A great many trees are badly injured in this way. We already have a large investment in highway trees and it is only the part of wisdom to protect this investment.

Michigan has started active work in highway planting and we hope in a few years to be able to point with pride to our highways, not only because of the good roadbeds but also because of the trees and shrubs that line those roads.

THE PRESIDENT: Is there any discussion on Prof. Chittendon's paper? If not, it will be received and filed in the proceedings.

It is now near the noon hour and I think it would be well to have Mr. Jones or Mr. Rush state what program has been arranged for this afternoon.

MR. J. F. JONES: I believe the plan is to get dinner here, and then to go to our nursery at Willow Street. From there some machines will take the parties who do not have conveyances, around to other points.

THE SECRETARY: Mr. President, in accordance with Article V of the Constitution, I move that a committee of five members be elected for the purpose of nominating officers for the ensuing year.

(Motion seconded and carried.)

THE SECRETARY: Mr. President, I move that Mr. Olcott be named the chairman of that committee.

Mr. J. F. Jones, Mr. John Rick, Mr. Ernest M. Ives and Mr. C. S. Ridgeway were nominated as members of said committee.

Messrs. Olcott, Jones, Rick, Ives and Ridgeway having been nominated were on motion duly elected members of a committee to nominate officers for the ensuing year in accordance with Article V. of the Constitution.

On motion the meeting adjourned until 8 p. m. same day.

EVENING SESSION

October 6, 1921, 8 p. m.

Hotel Brunswick

PRESIDENT LINTON: A recess was taken from the morning session until this time for the purpose of considering a roadside planting bill that might be recommended by this association to the authorities of every state in the Union. In order to bring this about we will have presented to you by Senator Penney, who was the introducer of the original bill that became a law in the Michigan legislature, a copy of the laws practically as they exist in our state today. We take a little pride in Michigan in being the first state to work along this particular line. Our agricultural college staffs, the highway department and several other branches of the Michigan government, are heartily and enthusiastically co-operating in this work. I have in my hand a notice that has been sent out by the state highway commissioner of Michigan to every highway commissioner in the state. We haye about two thousand of the latter. We have in the neighborhood of two thousand townships six miles square and in each of these townships we have a supervisor, we have a highway commissioner and we have members of what is known as the township board. This notice that I have, and you will see it is quite complete and goes into a number of details, is sent by our state highway commissioner to each one of the township commissioners of north Michigan, and he closes his letter accompanying it with this:

Fourth: (President Linton reads).

You will see from that that we are well under way in connection with roadside planting in our state of Michigan. I now take pleasure in presenting to you a member of our legislature who introduced the first bill that became a law along these particular lines, Senator Harvey A. Penney of Michigan.

SENATOR PENNEY: In the legislature of Michigan several bills have been introduced by its members, but as I stated at the last convention they were not drawn up in such a way that they were fitted for our laws. As Mr. Littlepage said it takes quite a while to figure out a law that fits your own state law. These several laws were introduced but in some way or another the committees of the legislature never took kindly to them and they were not passed. But two years ago I had a bill passed. Since then we have seen some imperfections and we passed another law at the last session of the legislature which provides that the cost of planting trees and caring for them shall come out of the maintenance fund, that is, the maintenance fund that provides for the maintenance of highways. I don't know how the laws are in most of your states but in Michigan the law is that the owner of land owns not only his farm but the land to the center of the highway subject to the right of the public to have the use of it for travel. Then how are you going to plant trees on a man's land if the highway belongs to that man? They did it on the theory that the trees were necessary for the maintenance of the highway. There never has been a test case on this law but the highway department has a very able lawyer who was in the attorney general's office and since then has been elected circuit judge of the county in which Lansing is located. His idea was that the trees should be planted on the highway for the purpose of protecting the highway, and the cost of planting them and taking care of them should be taken out of the maintenance fund. So that is the theory upon which they are working under this bill.

A BILL to provide for and regulate the planting of useful, memorial, ornamental, nut bearing and other food producing trees, shrubs, and plants along the streets, highways and other public thoroughfares and places within the State of (Michigan); and for the maintenance, protection and care of such trees and shrubs as a part of the maintenance of the roads in certain cases; and to provide a penalty for injury thereof, or for stealing the products thereof,—

The People of the State of (Michigan) enact:

Section 1. The (State Highway Commissioner) is hereby authorized and empowered and it shall be his duty to select and plant by seeds, scions or otherwise, useful, ornamental, nut bearing and other food producing trees, shrubs and plants suitable for shade, maintenance and protection of the highways along State trunk line and Federal aided roads and for the use and benefit of the public, and to care for and maintain all such trees, shrubs or plants. The care of such trees shall be deemed a part of the road maintenance work. The varieties or species so planted shall be subject to the approval of the

(State Department of Agriculture) and may be supplied by the (State Agricultural College) or other State Institution or Department, or elsewhere acquired by the (State Highway Commissioner). The (State Highway Commissioner) shall make and publish rules and regulations for the planting and proper placing of trees, shrubs or plants and for their proper pruning, care and protection under the provisions of this act, and all such planting shall belong to the State, but the owner of the adjacent land shall have the right to take and use the products thereof. All expenses incurred in planting or caring for such trees, and shrubs along trunk line and Federal aided roads of the State shall be paid in the same manner as is or may be provided by law for the payment of the cost of maintaining trunk line or Federal aided roads.

Sec. 2. Counties, townships, cities and villages of the State are hereby authorized to appropriate money for the purpose of planting, caring for and protecting useful, memorial, ornamental, nut bearing and other food producing trees, shrubs and plants along and within streets, highways, thoroughfares and other public places other than trunk line or Federal aided roads, within the respective limits of such municipalities and subject to the jurisdiction thereof. The expenditure of any such fund raised hereunder in a township shall be vested in the (highway commissioner) of the township subject to the approval of the township board. Any such fund raised by a county shall be expended by and under the direction of the (board of county road commissioners;) and any such fund raised in a city or village shall be expended by the highway or other proper municipal board or authority thereof, in accordance with its charter laws or ordinances or under the direction of the common council or legislative body of such city or village. All such appropriations made under this section by any municipality shall be made in the same manner as is or may be provided by law for the raising of money for highway or park maintenance purposes.

Sec. 3. Trees may be planted along the highways or other public places by proper authorities and designated as memorial trees for the purpose of commemorating important military or civic events, or in memory of any person distinguished for noteworthy acts, or for conspicuous service in behalf of the nation, the State of Michigan or any local community thereof. Suitable tablets, boulders or other markers of a permanent character may be contributed by any person, or by any civic or military association and placed in conjunction with such memorial trees subject to the approval and consent of the proper authorities in control or in direct charge of such highways or public places.

that

Sec. 4. The owner of any real estate in the state of (Michigan) that borders upon a public highway other than a trunk line, Federal aided or county road shall have the right to, plant useful, ornamental, nut bearing and other food producing trees and shrubs along the line of said highway adjoining said land, and within the limits thereof, and shall receive annually a credit of twenty cents upon his highway repair tax for each tree so planted and growing in good order: Provided, however, That all such planting shall be done in accordance with the rules and regulations prescribed by the (State Highway Commissioner) for the planting of trees along trunk line and Federal aided roads. Said trees and shrubs and the products thereof shall be subject to the same incidents as to ownership and use as are provided for in section 1 hereof with respects to trees planted along and within trunk line highways. No bounty shall be paid or deduction allowed under the provisions of this section upon any tree or trees for a longer period than five years.

The owner of the adjoining land shall have the care of such trees and shrubs and shall have the duty and responsibility for the trimming, spraying and cultivation thereof unless otherwise provided in the charter, ordinances, or other regulations of incorporated cities and villages.

In case any such tree or shrub should become diseased or shall in any manner interfere with the public use of the highway the authorities having jurisdiction over such highway may by written notice require the owner of the adjoining land to cut and remove such trees or shrub.

If such notice is not complied with within thirty days after service thereof such authorities may cut and remove such diseased or obnoxious tree or shrub.

Sec. 5. The (State Board of Agriculture) and other State Departments having lands and facilities therefore are hereby authorized to acquire and grow suitable seeds, scions, and trees for planting under the provisions of this act and to

> establish proper rules and regulations for the distribution thereof at nominal cost, or otherwise, to the State, to municipalities of the State, and to private citizens for the purposes hereby contemplated.
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> Sec. 6. It shall be unlawful to cut, destroy or otherwise injure any shade or ornamental tree or shrub growing within the limits of any public highway within the State of Michigan without the consent of the authorities having jurisdiction over such road. In the case of a trunk line of Federal aided road the (State Highway Commissioner) shall be deemed to have such jurisdiction in all cases. It shall also be unlawful to affix to any tree or shrub any picture, announcement, notice or advertisement, or to negligently permit any animal to break down or injure the same. Any person violating any of the provisions of this act shall be deemed to be guilty of a misdemeanor and on conviction thereof shall be punished by a fine of not more than one hundred dollars or by imprisonment in the county jail for a period not exceeding thirty days, or by both such fine and imprisonment within the discretion of the court.

Now some of the farmers along the road say that the trees will be diseased, but I don't think that nut trees as a rule, or shade trees, are affected very much with pests. The elm trees have been troubled somewhat. In the West where we live I don't think there is any trouble of that kind. There may be with apple trees and fruit trees.

Our agricultural college at Lansing has at the present time one hundred thousand trees ready to plant under this bill. There are some that they have been raising for a long time and some they have recently planted. They hardly knew what to do with them. Now they have agreed to turn them over to the state to be planted on our highways.

One thing that we had trouble with in Michigan was the telephone and telegraph companies stringing wires along the public highway. They have cut the top of the tree right straight off and disfigured the tree and disfigured the appearance of the highway. This bill is supposed to prevent that. Our highway department has been trying to get the telephone and telegraph companies to get the right from private owners to put their poles on private land; or to put a pole and let an arm stick out through the tree without cuttitng the tree down. I recently came from Detroit. There the telephone companies have started to string lines and to cut trees. The highway commissioner has notified them that they must not cut the trees down or cut them off or disfigure them and he has introduced the state constabularay to enforce this ruling. Undoubtedly sooner or later there will be a test case to determine whether or not the state has this authority.

I listened this afternoon to a discussion about walnut trees shading the highway. I have no practical experience to know whether these trees do any damage to crops on account of the shade, but supposing you raised a fine walnut tree along the highway and the tree begins to bear. Would not the products you get from that tree more than offset the damage it does to a crop close to the tree? I once had an aunt, when I was a very small boy, and it seems to me she said that she raised forty bushels of black walnuts on one tree. I saw that big hickory tree today. They claimed they raised fifteen bushels on that tree. I thought forty bushels was a lot to come off of one tree.

Mr. Bixby: That was in the husk. There have been records of that kind in the husk.

Senator Penney: This bill has been introduced and passed and Mr. Linton, who is practically the author of this bill, is desirous of having this followed up in the different states. I think it would be a good plan. What better investment could you make to beautify our highways than the planting of good trees? In the southern part of the state of Michigan there are quite a lot of good trees, black walnuts, butternuts, which not only add beauty to your highways but are useful in many ways. During the war we know that the government scoured the whole country to find walnut trees to make stocks for guns, and to use in airplanes for propeller blades. They used the shucks to make gas masks. The trees could be made of further service to man by planting them as memorial trees. And again they furnish food, not only bear leaves but food.

I would like to hear a discussion upon this bill from those who are from other states. I would like to hear what their opinion might be as to the different provisions of this bill.

President Linton: The subject is now open for discussion. I am sure that there are those here who would perhaps offer amendments to that bill. They might desire to modify it some. They might desire to add other features to it. For instance, it might be well to recognize the desire at the present time to save useful bird life throughout the country. That might be stated in the title to this bill as one of the purposes of roadside planting. Certainly that would be one of the results of road side planting.

Senator Penney: The bill provides not only for planting trees but for planting shrubs along the highway. That created quite a fight in the legislature. One fellow thought we were going to buy a whole lot of nursery stock and spend a pile of money. We are not. But here was the idea. Those shrubs are useful not only for furnishing food for birds. that are necessary to farmers. but are useful sometimes to prevent shifting sand. and also snow from covering the highways. You have often noticed that the railroad companies put up fences at different points to prevent snow from drifting on the tracks. Bushes can serve the same purpose.

President Linton: The subject is now before the body for discussion.

Mr. Littlepage: To print the newspapers in the United States it requires enough wood each year to make one cord of timber from Boston clear across the American continent and across to the Hawaiian Islands and further. Most of that, perhaps half of it, comes from Canada. There is cut from the forests of the United States every year timber to make wood pulp enough to make one cord of wood from Boston to Liverpool. That is just for newspapers. That has nothing to do with furniture, with houses, with cross ties. with everything else. which are estimated to take four times as much. Now if that be true there is cut every year from the forests of the United States enough timber to make four cords from Boston to Liverpool. That is going on every year. We met here seven years ago. In that seven years there has been enough timber cut from the forests of the United Stats to make twenty-eight cords of wood from Boston to Liverpool. Now when you begin to contemplate that you see what is happening.

Roadside planting furnishes one of the greatest opportunities. There are many details that will have to be worked out. The bill which the Senator and our distinguished President have given much consideration to seems to be working along the right lines. Many difficulties will come up from time to time but this is one of the things that this Association ought to get behind. Here is a great need, a fundamental need. when you think of the figures which I gave you. Here is one of the opportunities to fulfill that need. We, as an organization of tree planters, ought to get busy to help to work out the details and difficulties that cannot be all foreseen in the application of the machinery of roadside planing and the particular laws of each state. Some people think sometimes that because a fellow is a lawyer he knows all the laws. There are forty-eight different states in the Union. I know that every state in the Union has a statute of limitations. It is three years in the District of Columbia. It is six years here. The fundamentals, the machinery of laws, are different in these particular states. Now then, what are the duties and what are the opportunities? A duty and an opportunity are rather more or less synonymous after all. It is for this Association to get actively behind this proposition, and help adapt this legislation to each particular state, keeping in mind that the fundamental thing is to plant trees. We are meeting here in Lancaster, Pa., a city to which I have always turned my thoughts with great pride, because here was the home of the founder of the great common school system of America, Thaddeus Stevens. Do you suppose when he began to originate the system which has made America that he could foresee all the difficulties, that he could foresee the difficulties in Texas, in Indiana, in New York? He started with a principle, and that principle has been adopted and developed and worked out in each particular state, until we have the great forty-eight different big school systems of America. We can take this proposition and by working it out, adapting it to the particular machinery, the particular laws, and meeting the particular difficulties, we can work it out until it becomes a great monument. We must plant trees.

Mr. McGlennon: I want to say a word with regard to Senator Penney's reference to the importance of shrubs as a protection to the roadways from shifting sand. Mr. Volbertsen, my colloborator in my filbert enterprise in Rochester, got his early education in horticulture in Germany when a young man of twenty years of age, and he informed me the other day that along the side of the railroads' right of way, filberts were planted very extensively, in different parts of Germany, for the maintenance of the roadbed, to protect them from shifting sand. Not only that but they garnered wonderful crops of nuts.

Mr O'Connor: Concerning the planting of trees along the roadside, what enemies have they? I have watched this very closely since I have been connected with Mr. Littlepage's farm and I find that the walnut trees and pecan trees have very few enemies. I think that he has something like four hundred trees, and there were not three of them that were troubled with caterpillars. What better could we have along our road sides than nut trees when from the oak, the elm and other trees there are pesky worms dropping down when you go along with an automobile or carriage.

President Linton: I want to say to the ladies present that the ladies of Michigan are greatly interested in this work. We recently established a state trunk line highway known as the Colgrove Highway, named for the President of our Michigan State Good Roads Association. Senator Penney was the introducer of that bill also and it became a law. That particular road runs across our state in such a way that it is about three hundred miles in length. One county that it crosses is known as Montcalm County. At a meeting we had in their court house we had a committee named in each township through which the highway passed for the purpose of properly planting trees and beautifying that highway. Upon my return home I received a letter from the county judge saying that the people of Montcalm County would not stand for planting and beautifying that one road alone but the whole county has been organized and every township in it and half of the membership of each committee is composed of women, and they want these trees and plants on every township road as well as on that state road. That is the way in which the work is going along in many sections of our state and it will soon cover it all with the same enthusiasm. So that the ladies can be of great good in this organization also. There is not a home or a residence street but desires fine shrubs and fine trees. It is especially so with the farmers. They want these beautiful things that the city people have been having for many years in their front yards. They are going to demand shrubbery and trees beyond any call that ever has been made for them in the past. So you can readily see from our work, although much of it is to be carried on in a public way by our agricultural colleges and state institutions of that kind, that they will be able to furnish only one tree or one plant in a hundred of those that will be demanded. That feature I wish especially to impress upon the minds of any nurserymen that may be present. The call in the next decade is going to be along those lines, for ornamental shrubbery and for useful trees, just as the fruit tree has been called for in the past.

Mr. Fagan: I don't know that I have anything constructive to add to the road side planting idea. I know that our landscape gardener at the experimental station in the college has, in the past few years, been giving it serious consideration, and if I am not mistaken he has taken the question up with our forest and state highway commissioners in the state. How far it is going to go I don't know. There is a feature of the roadside planting which has been mentioned indirectly this evening that we must not overlook. Just as soon as we consider a program of roadside planting we must also consider a program for the control of pests. Regardless of whether they be pecan trees or hickories or walnuts we are bound to meet with these pests. Whenever we begin a systematic planting, or collection of plants, it does not make much difference whether oak trees, or catalpas or chestnuts, or what not, we can look forward to the time when we will be confronted with a pest control proposition. As to roadside planting in New England it would not make much difference whether it was a walnut or butternut or pecan. A gipsy or brown tailed moth would just as soon eat the foliage off a butternut tree as off an elm. We have here in New Jersey at the present time the Japanese iris beetle and it will eat anything in sight. As soon as we turn nature upside down, as we have nearly done in many sections of the country, we are bound to bring in these pests. It would be well in any law—and I know in this state we would consider a law, and an experimental station could have charge of work connected therewith—that one of the provisions we would insist on being put in the law would be one to control the pests which may come. Right in our district today the tent caterpillar is playing havoc with our walnuts; the oyster shell scale is going through our timber in Center County; and I can take you into the mountains five miles from any residence and I can show you oyster shell scale on half a dozen of our native species. It is nice to kid ourselves along to think our butternuts and our hickories would never be subject to these pests, but they will be. When the Northwest started to plant apple orchards they said they had no codling moths up there. There were some orchards that didn't but sooner or later they came. The time to nip those things is in the bud, and not let them spread. Lack of foresight has cost New England millions and millions of dollars just because they would not take the advice of one man when he told them that the gipsy moth and brown tail moth had gotten away from him. They laughed at him.

I wonder whether this association could not get our federal road department back of this idea of roadside planting. I know that back of the federal aid movement there is an important point of contact in roadside planting.

SENATOR PENNEY: Our bill provides that the highway department shall care for and maintain the trees. I think the bill is broad enough to cover that subject. I think we all realize that we cannot stop planting trees for fear of some pest that might come, but we have got to provide the means of fighting it if it does come. Our highway department in Michigan has employed a man, a graduate of Yale College who is an expert in horticulture and all this work of planting and caring for the trees is to be turned over to him.

Dr. Canaday: In many parts of Germany the practice of planting trees along the state highways has been in vogue for perhaps half a century. They have used fruit trees and it has been found to be very feasible. The state has found that the proceeds of the trees has gone a long way towards keeping up the highways. Of course they probably have had their population under more rigorous control than ours has been. They have been able to collect the proceeds of the trees better. The question of the railroad rights of way might be taken up. A few of the railroads in the United States have already begun planting trees along their rights of way looking forward to a future supply of cross ties. It seems to me the greatest difficulty that will be encountered in this work will be the conflict with the telephone companies and the power lines. If that can be satisfactorily solved, I think the rest of it will be comparatively easy.

Mr. Smedley: In Pennsylvania near our large cities, the highway department has become aware that the roads are all too narrow. There was a bill passed in the last legislature giving the commissioner of highways a right to establish the width of roads at thirty-three feet, I think it was, with one hundred and twenty feet as the maximum. The department is now making a survey of all the main highways near the large cities. I happen to live just out of Philadelphia, about fifteen miles, on the line between Philadelphia and West Chester. It is a continuation of Market Street the principal east and west street of Philadelphia. It was laid out sixty feet wide. That was one of the first to claim the attention of the department and it will soon be, I understand, established on the map as one hundred feet wide or probably one hundred and twenty feet. That primarily is to stop the encroachment of the buildings near Philadelphia so that when the question of opening this road to its new width comes up damages will not be excessive. Some of us living along there take great pride in that road and want to see it developed but it is going to be some time before this is opened to its full width and it is needless to plant trees until it is. I don't know how you have things in Michigan but a great many of our Pennsylvania roads are old highways that have worn down with banks ten or fifteen feet high, and it is oftentimes a question where to put the trees.

President Linton: Our highways in Michigan are, ninety per cent of them perhaps, four rods in width. That you will know is a good ample width, sixty-six feet wide. The basis of the planting as adopted by our state highway department, as I understand it, is thirteen feet from each line fence, making trees forty feet apart on opposite sides of the roadways. The main portion of the planting will be forty feet apart but that is simply a detail and the entire matter is left with the state highway commissioner and those who assist him. And, as stated by Senator Penney, they are very competent men in that department. Of course some trees would be placed further apart than others. There is no absolutely fixed distance. I don't know of any movement that will more quickly cause the planting of more trees than the one we are outlining at the present time in undertaking to cover the highways of this country. Michigan alone has six thousand miles of state trunk line highway. That is only a small portion of the highways in our state. These are the important roadways connecting our largest cities and business points. Just as an estimate I would say that we have ten times as many miles of roadway in Michigan as we have trunk line highways. If that average should be maintained throughout the country in each one of the states, and I imagine our state is an average one as to the number of miles of roadway, you would see that there would be three hundred thousand miles of trunk line highways alone, saying nothing about all the other highways and by-ways. So that I believe within the next five or ten years this roadside planting will cause more trees to be planted, and useful and valuable trees too, than all the efforts made in this country up to date in re-forestation. The people are alive to this subject and are asking for this very thing. It is only for us to map out a plan, arrange the details, and provide the sources from which they can obtain their supply and the trees will be planted.

It was my lot and good fortune last fall, following our meeting in the City of Washington, to visit Mount Vernon and there meeting the superintendent Mr. Dodge. He said to me that our association could have the products of the black walnut trees at Mount Vernon upon condition that that crop should not be commercialized in any way but used for public purposes. In behalf of the association I accepted the crop of walnuts, and, as I recall it, got in the neighborhood of thirty bushels of fine walnuts. They were selected walnuts the best and larger ones. It so happened that they arrived late in Saginaw, where my home is, and it was simply impossible to distribute them generally throughout the country. When it became known that we had these walnuts, and it became necessary to distribute these nuts and have them planted in our immediate locality, our people were delighted with the fact. and every school in every school district in the country called for them. and every city school called for some of these walnuts. They were planted in every school yard. in many cases with appropriate ceremonies along patriotic lines, and that did a great deal of good. Our citizens as individuals called for them. I was surprised to see the interest in it. They wanted them in their yards and at their city homes. Following all this I had about two thousand of these walnuts left. I wondered just what I could do with these. It was impossible to arrange a program for distribution so I asked the superintendent of parks of our city if he would plant and care for them and he readily agreed to do it. So that what was left of the consignment was placed in our finest and largest park. Shortly after having planted these. and the papers having noticed what had been done. I sent a copy to our honored first president, Dr. Morris. Soon thereafter I received a letter from him saying that he disliked very much to predict disappointment. but disappointment certainly was coming to us for our efforts in Saginaw, because, he said. "Mr. Linton. I have gone through this experience and the squirrels and other rodents will certainly get every one of those nuts. You will be disappointed in the results in the spring and I am telling you this so it won't come to you all at once. I want you to be prepared for the disappointment when it comes." I rather imagined it would come. I knew that the trees in that particular park harbored a good many fox squirrels and others. and I imagined they would get these walnuts. But I was very much astonished this spring to see the entire crop come up through the ground. I imagine it was a ninety-five per cent crop. So that we have about two thousand young walnuts growing about as high as this table from last year's planting. They are thrifty and they will be distributed around the state of Michigan this coming spring. and at other places. To show the interest manifested in that particular movement I will say that I received letters from perhaps half of the states in the country asking if they could not be supplied with some of these walnuts from George Washington's former home at Mount Vernon. I even got letters from the State of Virginia asking that some of them be sent from Saginaw. Michigan, to them in Virginia for planting at their home. So you can see how far reaching a thing of this kind can be. I know that we have started something here that will sweep from one end of the United States to the other. and will do more good along the lines of re-forestation than any organization up to date has been able to do.

Mr. Littlepage: I move that a committee be appointed to report at the morning session the best method of getting this bill before the various legislatures. I thought first of attempting to formulate what idea I might have in the form of a resolution, but it appears to me that it is something that may require a little thought. Therefore I move the appointment of a committee of three to report in the morning the best form of a resolution or whatever seems best to adopt by this association to get action.

This motion was put by President Linton and unanimously adopted.

The President appoints on this committee Mr. Littlepage, Senator Penney and Dr. Canaday.

President Linton: This action will close the discussion relative to the tree planting law. Any other subject that you desire to discuss can be brought before the meeting in any proper manner.

Mr. Bixby: As the secretary noted this morning, perhaps the most extensive program of nut tree planting which has yet been carried out has been on the other side of the world, in China. One of the members of the association is Mr. Wang who lives near Shanghai and is secretary of the Kinsan Arboretum there. Some time ago he obtained some American black walnuts from Japan. He planted them and they grew so much faster than he had anticipated, and I think faster than any other tree with which he was familiar, that he conceived the idea of planting the new highway, which was being made from Shanghai to Hankow, with these American black walnuts. In due course he sent a money order to pay for two thousand pounds to the secretary. Last year was not the best year to get black walnuts, and the secretary forwarded the money order to me and asked me if I could get these walnuts for him. There was more trouble in getting them in New York last year than there usually is, but finally I did get them and had them made up in twenty-two bags and shipped to Mr. Wang at Shanghai. In due course they arrived and he is anticipating great things from them. The growth that he reported of this first lot of black walnuts was something astonishing. It seems to me that they grew the second year ten feet high. It was a very astonishing growth, a much more vigorous growth than I ever heard of their making here. At any rate there are two thousand pounds of American black walnuts that have been shipped to China, and if nothing happens to them they will grow and adorn that new road from Shanghai to Hankow.

Mr. Jones: A matter that will be of interest is that Mr. Wang wrote me a letter in which he says that the black walnut grows three times as fast in China as the Japanese walnut. Here in the nursery we find the Japanese walnut doubles the black walnut in the first two years in growth.

President Linton: We would like to hear from those present who are familiar with trees, as you all are, as to the merits and demerits of the various kinds of trees that we desire to plant. In Michigan the only ones we are considering are the black walnut, the hickory, the butternut and the beech. The beech in our state grows to be a beautiful tree, as it does in most states in our country. In addition to that our state agricultural people are suggesting that we plant the hard maple, which is a fine tree in Michigan, and the basswood, and one or two others, to provide food along certain lines. The hard maple, for instance, produces maple sugar, the basswood the bees draw honey from. The simple and useful trees and shrubs are the only ones in our state that we are giving any consideration to.

Dr. Canaday: What would be the best way to start a hickory along the roadside? From the nut?

President Linton: From my experience with the black walnut I would say that would be the proper way to plant these hickories, to plant the nuts where the trees would be. It is far less expensive than any other method. It is easily cared for by the road men who take care of a section of the road.

Mr. McGlennon: I am interested in the cultivation and culture of the European filbert at Rochester and have been for a number of years, and I believe successfully. In different meetings of this association that I have attended and in correspondence with the officers of the association, filbert culture in this country has been referred to as still in the experimental stage. Now when you have been in a thing for ten or twelve years and have not had any set-back but progress along all lines of activity, I believe you have passed out of the zone of experimentation and have gotten down to doing something. That is what we have done in Rochester with our nursery which I believe is the only thing of that particular kind in the country. Mr. Vollertsen, my collaborator, came to me with this idea years ago. He told me what he believed could be done and what had been done in filbert culture where he had been until about twenty years of age, having worked in a nursery from the time he had been able to do manual labor. In this nursery they had given especial attention to the cultivation of filberts and he had learned their method of propagation. He told me about this and believed it could be done in this country. I corresponded with some of the prominent nurserymen in the New England states and they told me it would be folly to attempt anything like that in this country, that I would be wiped out by the blight. They had tried it with some of the European varieties. Nevertheless I went ahead and imported five plants of twenty leading German varieties from Hoag & Schmidt, a prominent firm of nurserymen in Germany. I turned them over to Mr. Vollertsen having rented land for him and furnished the funds for the fertilization and cultivation of the land, paying a wage to him to go ahead and make the experiment. I wanted to know rather than to believe. His method of propagation was from the layer. Now we have fruited these propagated plants and found them true. We started in with half an acre. We now have two and a half acres, probably fifty thousand plants altogether. We have never had the semblance of blight. Our cultivation has been thorough. Our fertilization has been consistent. Mr. Vollertsen has been on the job very steadily and understands his business thoroughly. I think that this talk of blight is something that we should not take so seriously to heart. On half a dozen occasions some of our good friends have said, "What about the blight; don't you think it will wipe you out?" I think it is well to be prepared for the truth but the same thing might be said if I plant a peach orchard, that in a few years it will be wiped out by the yellows. I can't make myself believe that the matter of blight in filbert culture in this country is a serious menace. The concensus of opinion in this association seems to have been that even if it does appear there are remedies for it. Our esteemed first president, Dr. Morris, when he visited our place in Rochester some years ago when the convention met there, said that he thought we should not worry about it. He was satisfied that if blight appeared it could be controlled by the removal of the blighted part. I believe that the same principle applies to the development of filbert nurseries as to any phase of life, that eternal vigilance is the price of safety. I believe that thorough cultivation, keeping the plants strong and healthy, will help them resist disease. But if blight does appear, by watching closely it can be removed and I think controlled, as suggested by Dr. Morris. Maybe it has been all right up to the present time to be on our guard but there is my work that has been going on for ten or twelve years. During these last two or three years we have been sending our plants all over the country, to California, Virginia, Pennsylvania, Ohio, Illinois, Iowa, Indiana, Canada, and we have been getting fine reports with not a single reference to the appearance of blight. On the contrary they report that our plants are fruiting and they ask for more plants. As a specific instance I can cite a prominent doctor in Louisville, Kentucky, who some years ago got some plants from us and some filbert plants from some other nursery. We had a letter from him the other day in which he spoke in most complimentary terms of the plants he had gotten from us, that they had fruited, were true, and he wanted to know if we could furnish him from fifteen hundred to two thousand plants within the next few years. William Rockefeller on the Hudson, another customer of ours, reports plants doing splendidly and fruiting well. Mrs. Jones of Jones & Laughlin Steel Company reports plants growing splendidly there. Those are just a few of the instances I could cite. As I suggested to some of the gentlemen today at the next meeting it might be well for me to bring specific references from different parts of the country where our plants have been planted and are bearing fruit and are doing well, with no reference whatever to blight having appeared, and I shall be very glad to do that.

It seems to me, too, that the filbert is one of the best nut producing plants for use here in the North. Usually it is grown in bush form. It is very hearty and begins to bear early and abundantly under proper care. In view of the exceptionally wide range of climates and soils it seems to be one of the good nut producing plants for this association. Now it can be consistently considered that I have an ax to grind as I am producing filbert plants for sale, but I assure you, ladies and gentlemen, that it is not with this thought in mind that I make these references. I have the interests of this association very much at heart. My whole time and attention and money is given to nut culture. I am extensively interested in the culture of paper shell pecans in Georgia. Successfully, I might also add. And I want to be equally successful with the filbert because I believe that it is the one great nut bearing plant that this association can stand back of and urge the people to plant, not because I am producing them but because I am a member of this association, and I want to see this association a success.

Three weeks ago last Monday, on account of my interest in pecan culture in the South, and having a good crop at our grove this year, I went to New York and spent the day there conferring with a big commission man down in the Washington Street section who handles large consignments of nuts. The subject of the filbert was discussed and I found a very great interest on the subject. They were one and all. I think I can say, appalled when I told them that there was a nursery in New York State producing filbert plants and filbert nuts. Mr. James, vice-president of the Higgins & James Company, showed me a very fine filbert, a variety with some unpronounceable name, I think Italian, and he said, "Isn't it a beauty?" It was. But when I told him that we had just as fine in Rochester and some finer he looked aghast. I invited him to come to Rochester and be convinced. He told me, as other did, that there was a wonderful future for the filbert in this country.

The filbert, too, I think, is especially adapted for waste lands on farms. A great many farms have considerable areas of waste land which, I believe, could be made very profitable by the planting of the filbert, because just ordinary farm soil with ordinary fertilization, according to our experiments, demonstrates that the filbert will make "the desert to bloom as the rose." And it is a beautiful shrub for ornamental purposes. Come to Rochester and go down to Jones Square, and you will see a beautiful border of the purple filbert. Some of our customers are purchasing it, William Rockefeller for instance and Mrs. Jones, for the borders of walks and drives. I think that we should try to reach the gardeners and the agricultural and horticultural societies of the country in our campaign for the furtherance of nut culture.

In Dr. Kellogg's recent list of diets, fruit and grain and vegetables, covering two pages of his pamphlet, he gives there as the food value of the pecan in protein, fats, and carbo-hydrates 207.8, and next to them the filbert, 207.5, and next the English walnut at 206.8, and next to that the almond, at 191.1.

Mr. Bixby: I really think that Mr. McGlennon has done more than anybody else to get the filbert on a practicable basis. He has also mentioned why the association has been a little bit cautious in saying too much about the filbert. In some of the early plantings the blight made serious inroads. There has been a lot learned about the blight since that time and apparently it can be controlled by cutting out the blighted portions. I have seen filberts in certain sections of the country where the blight went half way around the twig. Apparently that can be controlled by cutting out that blighted portion. Or, if the worst came to the worst, by cutting off the limb. But there have been a number of filbert plantings made the last few years where that blight has not appeared at all. One of the greatest difficulties with the European filberts was that while the bushes would grow all right they would not fruit, or fruit only once in a few years. Mr. McGlennon, when he imported those plants from Germany, apparently took all the varieties the man had. I believe that is one reason why Mr. McGlennon is raising filberts when most of the plantings of one bush, or two bushes of one kind have failed. He has enough varieties to properly pollinate the hazel flowers. That is a thing that must be borne in mind. Any one wanting to plant filberts must not ask what is the best filbert and plant one. He must say, what are the best filberts, and plant several varieties. I believe that is one of the things that has enabled Mr. McGlennon to raise filberts when many previous attempts have failed.

Mr. McGlennon: Replying to Mr. Bizby's remarks they are well taken. I overlooked mentioning in my talk a fact, because I believe it is a fact, that it is due to the number of varieties we have that every variety has fruited. Now they are in the nursery and the principal consideration is wood. We are working every plant for wood. We have not been able to supply the demand for plants and won't be for another year or two. Next year I shall probably have ten to twelve thousand plants. We layered some twenty-five thousand plants last year, and we are layering some twenty-five thousand this year. Mr. Vollertsen has been very persistent with regard to the maintenance of the smaller nut varieties, has insisted upon it, because we have found that they are very much freer bloomers than the larger fruited varieties. We have made up our selection, as catalogued, carefully to that end, including some of the smaller fruit varieties. A party asked me the other day if I would send them a plant this fall. I said, "No, but I will send you three plants," meaning one of the small fruit and two of the larger fruit. It is the larger fruit that the consumer is going to demand. He is going to buy the larger nut, although the smaller nut is really better for eating.

Convention adjourned until 9:30 a. m., October 7, 1921.

MORNING SESSION

Friday, October 7, 1921

The Convention was called to order at ten o'clock by President Linton.

THE PRESIDENT: The first on our program this morning will be the report of the Committee on Uniform Bill for Roadside Planting. I will ask the chairman, Mr. Littlepage, to make the report.

MR. LITTLEPAGE: The committee met last night after adjournment and considered different methods of getting this bill (a copy of which I now present) before the various states, and after some deliberation it was decided to report, on behalf of the committee, as follows:

That the committee,—the same committee which has been appointed,—be authorized by the association to prepare in proper and simple form a sufficient number of copies of this bill, to be accompanied by a letter, formulated by the committee, which letter will set out substantially three things:

First: Call the governor's attention to the fact that this bill is the one adopted by the State of Michigan, but that it should, or course, be modified to comply with the special judicial or road machinery of each particular state.

Secondly: A short argument in behalf of this character of legislation.

Thirdly: A request to each governor that he refer the bill to his attorney general to put it in proper form to fit into the machinery of his particular state, and that he also refer it to his appropriate state board of forestry, agriculture or what-not.

We suggest, as I said before, that this committee be authorized to prepare a letter along those lines, to be accompanied by a copy of the bill, and that, after it is prepared and ready, it be sent out by either the president or the secretary of the association. It was also thought by the committee to be desirable, at the same time that this is sent to the governor of each state, to send copies to the various agricultural and horticultural journals of the respective states, that being done with the view of getting some publicity. Then, too, the committee thought that it might be well, at that time, for the respective members of the association in these various states to write to their representatives in the legislature calling attention to this bill.

Now that is the report of the committee, and, Mr. President, I move that this report be adopted and the committee instructed to act along those lines.

(Motion seconded and carried, and the report of the committee was adopted unanimously.)

THE PRESIDENT: Now, ladies and gentlemen, I consider that we have performed a most important task in the pioneer work connected with roadside planting in America. There is no question but that with this association the idea first originated; and the work to date along those lines in the United States has been brought about by the Northern Nut Growers' Association. It is a work in which I, personally as well as officially, as you know, have been greatly interested and the unanimous adoption of the committee's report, endorses that line of work. I wish to thank you, individually and collectively, for your interest and the action which you have taken.

MR. LITTLEPAGE: I feel that our president in this instance has hit a high-water mark. He has taken hold of a very important idea and has developed it. After making an observation or two I am going to move a vote of appreciation to our president and accompany it with a vote of thanks to Senator Penney for coming down here from Michigan and lending his aid and enthusiasm.

We listened last night to a discussion about this roadside planting. As I observed before it is not without its difficulties the same as everything else; but this proposition extends to the various state boards of horticulture, highway, or what-not, one of the greatest and finest opportunities. Personally I believe in nut trees; but you must first get the public with you. Suppose you had a highway into Lancaster lined on either side for a half mile with pink weigelias in the spring. You would have the whole population going up and down that highway looking at the display. And the pink weigelia is almost a fool-proof shrub. It grows without cultivation and grows very rapidly and blooms in the greatest profusion. Suppose in mid-summer you had another highway lined with hydrangeas. I believe a particular one that is hardy is called paniculata grandiflora. It is a fool-proof shrub also, requires very little care and comes on after the other flowers go. It also can be produced very cheaply. You would have the population looking at and admiring the blooms and it would inspire, in each one of those individuals, a desire to go and do likewise. Suppose you had a half mile of sweet gum trees. If you go down through the counties of Pennsylvania now you will see the sweet gums—some of them a deep dark purple, some of them a bright golden yellow, some of them red, some of them with all the colors and all summer a beautiful foliage—suppose you had a half mile of those leading into a street of any city in America. The population on Sunday would drive out there and admire their beauty. It affords a wonderful opportunity. The individuals who care for those trees and shrubs, while moving up and down the highway caring for them, will be carrying with them a little university of horticultural knowledge. The average farmer thinks it is a terrible thing to spray. It is the simplest thing in the world as you know. This machinery by which these trees and plants and shrubbery would be cared for would be a moving university up and down the highway teaching the farmers how to care for their trees. Mr. Rush's trees which we saw yesterday were the finest examples of well cared for trees. You could not travel over the country and find trees showing a finer degree of care. Nobody could look at those trees without feeling that he would rather give a little more care to his trees. So that, if this idea is carried out, as it will be, it will become popular with the various state boards. They like to do things that are popular or that please the people.

As I said at the commencement of my remarks I am going to take the liberty of moving a vote of deep appreciation to the president (Mr. Linton), and also a vote of thanks to Senator Penney.

(Motion seconded and carried unanimously.)

THE PRESIDENT: I desire to thank you, one and all, for this vote of appreciation. My connection with the Northern Nut Growers' Association has been of a most pleasant character. I have found a group of men and of women who are interested not only in their own welfare but in the welfare of the race. What we have started today—or rather completed so far as organization is concerned—will do as much good in the United States in the next decade as any movement that has been started by any organization or association. It means reforestation on a larger scale with rifht trees and right plants, as stated by my friend Mr. Littlepage. A new start will be made along those lines. The poor trees will be cast aside and the next generation will have trees and bushes and plants that not only will be beautiful to the eye but will be beneficial to mankind and to those birds and animals that we desire to have around us.

The greatest credit should be given to those of this association who in a scientific way have endeavored to bring about better varieties of nuts, better varieties of the products of trees, and their names certainly should go down in history with that of Burbank, or with those of other men who have devoted their lives to this kind of advancement. I am sure that will be the result. I know that, as the message goes down along the line to the various states, their efforts will at least be recognized as having been beneficial and advantageous to all.

I want again to thank every one of you for the kindness that you have extended towards me and to my colleague, Senator Penney, who is most actively engaged in this work. Situated as he was—a most prominent member of the Michigan legislature—he was able to promote the very work in our Wolverine State that we today are undertaking to bring about in the United States, and I would call upon Senator Penny to say a word in this connection.

SENATOR PENNEY: Mr. President, it seems to me that, after all these remarks have been made, this subject has been very well covered. I was very much interested in the remarks of Mr. Littlepage because he spoke of different ornamental trees and shrubs with which I am not familiar and which are not grown in our part of the country.

Our esteemed president, Mr. Linton, is doing a wonderful work up in Saginaw at the present time in conjunction with our superintendent of public porks. He is helping to lay out some of our parks and to plant trees and shrubs there. One gentleman of Saginaw furnished the means to buy one thousand trees and the matter was put in charge of Mr. Linton to see that they were properly planted. This work and similar work Mr. Linton and I have undertaken to promote and to push. We have done similar things in regard to the promotion of good highways. We have absolutely no interest in stone quarries or gravel pits or in any kind of contracts for the building of roads; yet we have spent several hundred dollars or more in going about Michigan giving talks at different meetings and promoting roads. One of the things that Mr. Linton tried to promote was this tree planting bill. Inasmuch as I was in the legislature I had the opportunity of helping to put this work across. We have a wonderfully good highway commissioner in our state. He is enthusiastic over this proposition. While our bill was passed just a short time ago, he has already planted eighteen miles of trees in one locality, and, he said, at very little cost. Just think what might be done throughout the United States. Suppose the prominent highways throughout the United States were planted with useful and ornamental trees, beautiful shrubs and things of that kind. Wouldn't it be a wonderfully beautiful and useful thing for the country?

In closing I wish to thank Mr. Littlepage and the other members of this association for the very kind treatment we have received here.

THE PRESIDENT: We are fortunate in having a paper that was prepared and will be presented by our esteemed treasurer Mr. Bixby, and I take pleasure in calling upon him at this time.

WHERE MAY THE NORTHERN PECAN BE EXPECTED TO BEAR

Willard G. Bixby, Baldwin, Nassau Co., N. Y.

In the January 1916 issue of the American Nut Journal is an article by Meredith P. Reed read before the Western Association of Nurserymen at their annual meeting in Kansas City, Mo., December 1915 entitled the Pecan Areas of the United States, describing the limits between which the pecan may be grown. In this paper the matter of the Pecan Belts of the country are discussed and their extent determined pretty largely by the length of the season (in average years), that is by the number of days between the latest spring frosts and the earliest fall frosts. A map was shown on which these areas were marked out, and it has been very useful to the writer in answering inquiries from persons who want to know if pecans can be grown in a given section.

Mr. John Garretson, Aspers, Adams Co., Penn., has on his place bearing Stuart and Schley pecans, two of the standard southern varieties. These bear nuts of typical shape but which are only a fraction of the size that these nuts would be if grown in southern Georgia. This clearly shows that some of the standard southern pecans require something which they do not get at Aspers to enable them to properly mature their nuts. The trees stand the cold of winter but the fruit does not properly mature. Mr. Jones has suggested that it is heat that is lacking and has advanced the idea that even though the trees are hardy to winter cold they have not sufficient summer heat at Aspers to enable them to mature their crops. This has brought up the question as to whether there was any method of measuring the summer heat available for causing pecan nuts to grow and mature.

Observations on northern pecans (and some southern ones) on my place at Baldwin caused me to note that no pecans started to vegetate at Baldwin before May. May is the first spring month here when the pecan will leave out. May is also the first spring month when the average monthly temperature here will reach 50°F. It occurred to me that if we note the excess average monthly temperatures over 50° and sum these items for a season we would get what might be termed a figure for "pecan growing heat units." This figure of 50° is doubtless capable of some refinement. There is no reason to suppose that further study may not show that it should be somewhat more or less but it is the best we have so far and seemingly it is proving useful.

If we calculate these figures for Evansville, Ind., for 1914, for example, and show the method of doing it we will have

1914	Average Monthly Temperatures	Average Monthly Temp. in Excess of 50 deg.
January	39.6	
February	29.9	
March	42.0	
April	55.4	5.4
May	67.9	17.9
June	80.0	30.0
July	82.2	32.2
August	78.0	28.0
September	69.6	19.6
October	60.8	10.8
November	49.2	
December	31.0	
	Total	143.9

The pecan growing heat units, pecan units they may be called for short, for Evansville, Ind., in 1914 were 143.9. From this we might conclude that a place where the pecan units for 1914 would figure out 143.9 would be likely (as far as climatic conditions are concerned) to grow pecans as well as Evansville, that is, of course if other years should show similar figures.

With the idea of seeing if the experience of those who were growing pecans would be anything like what might be calculated from the Weather Bureau Records, letters were written to all members of the National Nut Growers' Association to find out if pecans grew and bore well in their sections and if so which varieties. From the replies received it has been in a number of instances difficult to judge just how well pecans grow in some sections. For this reason I have interpreted the replies somewhat on the basis of my own knowledge and on certain facts told me by Mr. C. A. Reed. Apparently at least 175 pecan units are to be found in most places where the southern pecan is successful commercially. This correspondends to a line through Augusta, Milledgeville, Macon and Columbus, Georgia and Montgomery, Alabama. There seems little question but that pecans can be grown north of this line but until I get more positive information than I now have I shall doubt if the planting of southern varieties of pecans much north of this line is nearly as advisable as it is south of it.

When we come to compare this figure with the pecan units for Ocean Springs and Pascagoula, Miss., where a number of the fine southern pecans originated which are now being propagated we find an average of about 222 pecan units. To reduce this to a percentage we find that many of the standard southern pecans grow and bear well when the pecan units are as low as 79% of those of the place of their origin. In other words the adaptability of the southern pecan is 79%, that is it will grow and bear well where the pecan units are as low as 79% of those of the place of its origin or to use rough figures, 80%.

When we come to ascertain the pecan units of the locations where the northern pecan grows and bears well we will consider Evansville and Vincennes, Ind., as places where it bears well; Burlington, Ia., as a place where it does quite well, but not as well as in Evansville; Clinton, Ia., as a place where trees are growing well but where they bear a large crop only once in several years; and Charles City, Ia., as a place where the pecan does not mature its nuts. The pecan units are also shown for several important places outside of the native pecan area.

	Highest		Lowest		Average
Evansville, Ind.	(1919)	147.5	(1917)	116.4	135.7
Vincennes, Ind.	(1914)	144.7	(1918)	123.1	130.8
Burlington, Ia.	(1914)	125.8	(1917)	90.2	108.4
Clinton, Ia.	(1914)	109.2	(1917)	75.3	94.9
Charles City, Ia........	(1914)	91.2	(1915)	65.4	78.5
New York City	(1914)	101.2	(1917)	85.2	94.3
Lancaster, Penn.	(1919)	108.7	(1917)	84.9	98.4
Gettysburg, Penn.	(1919)	108.4	(1916)	89.4	100.7
Cincinnati, O.	(1914)	131.7	(1917)	88.9	109.5
Baltimore, Md.	(1919)	127.2	(1917)	106.7	121.0
Washington, Md.	(1918)	126.8	(1917)	104.7	119.3
Hartford, Conn.	(1919)	88.9	(1917)	71.8	85.1

If we consider that Evansville and Vincennes are the center of the pecan district near which most varieties have originated and that a place should have 80% as many pecan units as in this Evansville district in order to have the northern pecan do well, a place should have 105 pecan units in order for one to feel reasonably certain that the northern pecan will do well there. It will be both interesting and instructive to see how well the applications that may be made from the conclusions compare with observed facts.

We know that there are large numbers of pecan trees at Burlington, Ia., and that the trees grow and bear well. Its pecan units are 108.4. We should conclude that at Baltimore and Washington with pecan units at 121.0 and 119.3 respectively that pecans would grow and bear well. There are pecan trees over 100 years old at Marietta, Md., which is half way between Baltimore and Washington. These trees bear nuts and although it has not been possible to get bearing records it is evident that they bear considerably for on the roads of that vicinity are hundreds of young pecan trees which evidently came up from nuts borne by these old trees. We should expect the pecan to do well at Cincinnati, O. In fact I have been expecting to find it native there, but, so far all inquiries have failed to do so. At Fayetteville, however, which is about 40 miles east of Cincinnati and somewhat north of it, are bearing pecan trees raised from seed brought from Shawneetown, Ill., which is in the Evansville district. Seed from these Fayetteville trees planted at Baldwin have shown nearly 100% germination.

There is some question as to how well pecans should bear at Gettysburg, and Lancaster, Penn., and at New York City where the pecan units are much like those at Clinton, Ia., where, on forest pecan trees, we get a fair crop but once in several years. Perhaps with our present knowledge these places should be considered on the borderland between the country where the pecan is likely to do well and that where it will not mature its nuts. We know that pecan trees have borne nuts at Aspers, Pa., near Gettysburg, at Lancaster, Pa., and at Westbury and Glen Cove, Long Island, near New York City but so far it has not been possible to make sufficient observations to form definite conclusions as to what to expect. It seems quite likely that fertilization and care may help materially the maturing of crops in those sections which in our present knowledge we must consider on the borderland.

Probably we should not expect pecan nuts to be borne at Charles City, Ia., where pecan units are but 60% of those at Vincennes, and pecan units at Hartford, Conn., are not so very different. There are northern pecan trees at Charles City, Ia., which many years ago were brought there, but the information I have about them is that they have never borne. There is a large pecan tree at Hartford, Conn., but I have never been able to learn of its bearing nuts.

As the northern pecan trees now being planted get to bearing age we shall have actual experimental data as to what they will do in the different sections. Until that time by the method outlined herein and with the Weather Bureau Records for several years at hand inquiries regarding its probable adaptability for a given section can be answered with far more confidence than was possible heretofore.

The President: Is there any discussion upon the excellent paper just read by our treasurer?

Mr. Jordan: May I ask if, according to that theory, the Stuart and the Schley would not be expected to do well in Washington?

Mr. Bixby: I should say not. My intention was to indicate roughly a dividing line between where the pecan would be an important commercial crop and where it would not. We know the Stuart pecan bears pretty well at Petersburg, Virginia; it bears at Aspers, Pa., which is near Gettysburg, but the nuts are a fraction of the normal size and not very well filled.

The Secretary: We all appreciate the amount of work that is represented by this report of Mr. Bixby and how valuable it is from a scientific as well as from a practical point of view. I wonder if it could be made more useful if Mr. Bixby could make a little map showing the isothermal lines on the basis that he has followed in his investigation.

Mr. Bixby: That could be done in a very general way, but altitude makes such a difference that there would be many places included in any belt at which, probably, certain pecans would not grow nor would not mature. It is very evident that local conditions make a great difference. I should say that a map to be useful would probably have a series of dots all over the country indicating what pecans would be best grown in that section; and while that would, to a certain extent, form belts yet there could be selected many places in any one belt where another pecan would be preferable.

Mr. J. W. Ritchie: I started in this nut growing business knowing nothing about it. I found that there were men in it who had been working at it for years who knew many things that I wanted to know. They forgot that I knew nothing and that I might want to know some of the things that they had in their minds which gave them a background. I think there ought to be some way by which all this knowledge that we have can be brought together so that a beginner could pay a dollar or a dollar and a half or, if necessary, two or three dollars and get it all at once. I have visited Washington and have seen Mr. Littlepage. He showed me some Kentucky hickories and Stabler walnuts and I then decided that if I could raise any nuts there would be no trouble about selling them. I can sell just as many of those nuts as I can produce; but yet I do not know a thing about how many nuts will grow on a Kentucky hickory in one year. If you will lay the facts before me and let me judge them I will take the risk myself. I do not want anybody to tell me whether to plant nuts or not to plant them. I will decide that question for myself if you will give me the data to work on. I want a book that will give me the varieties. I want to know what particular nuts can be put out in this region here that would have a chance of commercial success. Then I would like to know as much as I possibly can about those varieties, their respective qualities, what they will produce and especially how to propagate them. I happen to have a place where there are a great many walnuts, butternuts and hickories. I would like to know, in detail, how to propagate those nuts. In a conversation with the secretary he spoke of northern pecans. I have read about the Marquart, the Burlington and the Witte. I do not know whether the term "northern" included those three or not.

Treasurer Bixby: I would be very useful if I could directly answer a good many of the questions that are asked. A great many people would like to know the pecan they can plant in their sections and be sure of success. That I would like to tell them. I do not have the information. It is frequently more difficult to answer questions than to ask them.

Regarding the Burlington and the Witte pecans, they come from the most northern section where good pecans have been found, where the heat units are the lowest. They come from Burlington, Iowa, where the heat units are 180, if I remember correctly. If we assume a place where the heat units are 80 per cent of those at Burlington, those pecans should grow and mature there. They would probably do fairly well in New York City. I think we might feel justified in saying that they would not do well at Charles City, Iowa, because pecans from near that section, or back north of that section, have been growing for twenty-five or thirty years, and have not fruited. There the pecan units are very low, only 78. It would seem reasonable that at places where the pecan units are somewhat over 90, including New York City, Lancaster, southern Pennsylvania, and of course practically all sections south of it, they ought to do well. Those are the safest pecans, the Marquardt, the Burlington, the Witte, and the Green Bay, to plant in the northern section.

Mr. Littlepage: The Stuart pecan originally stood within fifty feet of the Gulf of Mexico. There is where it originated. It is one of the leading southern nuts; and yet I saw a Stuart bearing nuts in Mr. Roper's orchard down at Petersburg, Virginia. It has grown beautifully. There is a strictly southern pecan, nurtured by the waters of the Gulf of Mexico, which has the widest latitude. You can find the same thing up north. The fact that the Burlington grows at Burlington, Iowa, means this, that it ought to grow in all similar latitudes, or else violate known laws of horticulture. But it does not mean that some other pecan that grew 250 miles south of that might not grow still further north. The questions asked are important. Why does not the association, just as fast as it gets information, stick a pin there and fasten it down? For example, will pecan trees grow, say, on the thirty-ninth parallel, which runs through my grove down in Maryland. They will. Will they bear? There is one Major there that has this summer fifty pecans on it; another one there with perhaps a dozen. On the 27th day of March of this year, which was Easter Sunday, the temperature dropped sixty-eight degrees in twenty-four hours. It is a wonder it did not kill the forest trees. But with all that the pecan stood there just as hardy as the oak. It destroyed some of the ends of the swelling buds, not the dormant buds but some of those that had begun to swell a little, and that no doubt affected the crop or we would have had, perhaps, all the varieties, the Butterick, the Warrick, the Niblack, the Busseron, the Major, and the Green River fruiting. Do we want to grow a Major? I do not know. But the man that makes the mistake is the man who fails to set nut trees. How about the Stabler walnut bearing? It bore matured nuts at the age of four years on my farm in Maryland this year. The nuts are here. That answers that question. I have very grave doubts about pecan trees thriving in the Lancaster latitude; yet it may be that I am wrong about that. There may be some particular variety that will thrive here. If I lived in this section I would set out the trees so that when the one, two, three or four varieties are found that will thrive here we will have something to work on. There isn't any question about the black walnut or filbert thriving here, or the hickory, because we find them growing. If you go through southern Michigan and northern Indiana, you will see the shagbark hickory by the thousands growing along the railroad. This association should endeavor to get some affirmative data and distribute it among its members.

I have a row of Indian hazels. I put them on the side of my garage to make a sort of a screen because they grow those big crinkling pretty leaves. That row is probably fifteen feet long. If I had forty acres of those hazels with the same quantity of nuts on that are on there this year I could buy another farm.

Mr. Olcott: I would like to ask about Evansville, Indiana.

Mr. Littlepage: Evansville, Indiana, is almost exactly on the thirty-eighth parallel. The Busseron pecan tree grows almost exactly on the thirty-ninth parallel which is the northern boundary of the District of Columbia. The big orange groves in California are at the Lancaster latitude, which shows just how such things twist and turn, how difficult it is to learn them and why it is going to take a lot of experience to work them out.

The Secretary: I knew that Mr. Jones was a very patient and a very courteous gentleman; but I did not suppose that his patience and his courtesy would enable him to sit there for nearly a half hour with, lying in his lap unopened, the new book on nut culture which has just been published by Dr. Morris, probably the first copy that you or I have seen. I see that Mr. Jones has finally yielded to temptation and has uncovered the book. Perhaps that is the book that will supply Mr. Ritchie's needs. I mention it now because I think that you all ought to know that such a book has been published by Dr. Morris and that it can be bought of the MacMillan Company, Publishers, of New York City.

Mr. McGlennon: I think Mr. Jones has overlooked the following on the fly leaf of Dr. Morris's book:

> *"To J. F. Jones, first authority in the world today on the subject of nut growing. With the compliments of one of his pupils, Robert T. Morris.*
> *"New York, October 3, 1921"*

(Applause).

The President: If there is no further discussion along this particular line, we will now receive the report of the committee on grades of membership.

TREASURER BIXBY: The committee recommends that Article II of the By-Laws be amended so as to read as follows:

"Annual members shall pay two dollars annually, or three dollars and twenty-five cents including a year's subscription to the American Nut Journal. Contributing members shall pay five dollars annually, this membership including a year's subscription to the American Nut Journal. Life members shall make one payment of fifty dollars and shall be exempt from further dues. Honorary members shall be exempt from dues."

It was moved and seconded that the report of the committee be adopted and the amendment to the by-laws made as therein recommended.

(Motion carried unanimously).

THE TREASURER: I would like to give notice of our intention, at the next regular meeting, of moving to amend Article III of the Constitution, by adding to the same the following:

"There shall be four classes of members: Annual, contributing, life and honorary. Annual, contributing and life members shall be entitled to all rights and privileges of the association. Honorary members shall be entitled to all rights and privileges of the association, excepting those of holding office and voting at meetings."

THE PRESIDENT: Notice has been duly made and will be filed in the proceedings of the session.

We have with us Prof. F. N. Fagan to whom I am sure you will be glad to listen at this time in connection with the work that is being carried on at State College with which institution he is connected.

PROFESSOR FAGAN: At the Rochester meeting we reported on an English walnut survey that was made in Pennsylvania. Since that time we have not done anything except with Mr. Jones's and Mr. Rush's help, to gather information about the parent trees of which we located definitely about three thousand and indefinitely probably two thousand more. All of these trees but one were in bearing. They were seedling trees and as much variation was found in the trees as we would naturally expect to find in seedling trees. Our problem is to determine the trees worthy of propagation. It is necessary also to solve better the propagation problem. We cannot expect to get any large amount of planting of any of our nut trees until we can put the trees to the public at a price at which it will feel that it can afford to invest. To the members of this association, or to other people vitally interested, two or two and a half or three dollars is not anything for a good tree; but to the average planter of home ground or farmstead that is too much money. We all know that it is not an easy task to propagate these trees and we are not condemning the nurserymen. We know that they cannot afford to grow a budded or a grafted tree of known parentage for any less. So the problem of propagation is one of the largest that we have before us. and it is one to which our station and I myself are giving all the thought and time that we can.

We realize the importance of the nut industry in the state if for no more than roadside and home planting. Whether commercial planting will extend through the north with our black walnuts, our butternuts. our hickories and our English walnuts. to the extent that it has in the south with the pecan. is a question which time alone can solve.

We now have new land at the station suitable for the planting of nut trees. It is going to be the best land that we have on our new farm and we hope next spring to make a collection planting of varieties. We have not much money but we can make a start. It is not going to be at a place that will be set aside and not cared for. It is going to be along the public road. where we will have to take care of it or we will be criticised.

Until we solve our problems of selection and propagation we will go along at a fair rate of increase in regard to our plantings; but we will not reach the man who has a piece of ground and who says, "I would like to plant that ground in walnuts. maybe fifteen or twenty trees but I cannot put thirty dollars into those trees. or twenty dollars when I can buy apple trees for twenty cents."

Yet the future looks just as bright to me as it did the day I started to make the English walnut survey, just as bright because we will overcome these obstacles.

I might close by saying that while we are ready at the college and at the experiment station to go ahead we are not ready to plunge into any extensive experiments. It requires money and the money does not come in such quantities that we can plunge into anything in fact. But we are ready to begin to build a foundation on which we expect later on to experiment. and I hope that in ten more years, or in nine more years. if this association comes back to Pennsylvania. we can invite them to the experiment station to see what foundations we have laid and what progress we have made in the experimental work of nut culture.

The President: Will there be any discussion on the subject so ably covered by Prof. Fagan? Are there any questions that you desire to ask the Professor?

The Secretary: I would like to ask Prof. Fagan if he has a good word to say for the English walnut in Pennsylvania and in other parts of the country as a profitable tree to plant, from the result of his inspection of the trees of the state.

Prof. Fagan: We get a letter probably on an average of once a week from some one in the State of Pennsylvania who wants to plant anywhere from five acres to a hundred acres in English walnuts. We tell him to go slow, to feel his ground out pretty well and to remember that he is planting a tree that is a greater feeder, probably, than any other fruit tree; that it must have food or it won't grow; and instead of planting a hundred acres to plant maybe half an acre and select the best varieties that information at the present time indicates, those that lived through the winter of 1917-1918.

We have seedling trees in Pennsylvania that probably date back to near revolutionary war times; in fact there are some around Germantown that no doubt were growing at the time of the revolutionary war, around the old Germantown Academy. Personally I would not hesitate to plant as good an acre of land as there is in Lancaster County, or ten or twenty or fifty acres, to the better types of English walnuts that we have today. It probably would not be profitable in my time; I do not know; but it certainly would be profitable in the lifetime of my children. I would not, however, want to plant the nuts on cheap and poor mountain land where the most of our larger plantings, even of chestnut, have been made throughout the country, on land that was not worth the attention of other crops. When people write to us that they have certain types of land we always tell them if they can grow an average crop of corn, wheat, clover or potatoes on that land there probably isn't any question but that if they plant English walnuts they will be successful in raising some English walnuts. Whether they will raise them profitably or not is another question. But nothing can take the place of one or two good trees on every farm, especially in southeastern Pennsylvania. There isn't much question but that those trees can be grown successfully from a line through Allentown to the Susquehanna River and on over to the general range of the Allegheny Mountains, down to the Maryland and West Virginia line. Even in our higher elevations of sixteen or eighteen hundred feet I can show you some good old bearing trees that are ten or twelve inches in diameter. No dwelling houses there. They are out in the country and they are high up.

The Secretary: As has been stated the esssential thing in the successful growing of Persian walnuts, and probably other nuts, is high fertilization. I believe that many of our failures to grow the Persian walnut are due to lack of sufficient food.

The Treasurer: I do not suppose that any one in the association has made more of an effort to get better records than I have—at least I have made a good deal of effort. I have learned that in 1916, if I remember correctly, the Stabler bore sixteen bushels of hulled nuts and it was estimated that two were washed away by the rains. In another year, I was informed the Weiker tree bore twelve bushels. In following up other trees I found it impossible to get any results. I tried to get information as to the parent Hales hickory and the most I could learn was that the family had gathered as high as two or three bushels in one year. But when I saw that the tree stood on the side of a well traveled road with only a low stone wall to get over, and that the squirrels were plentiful and the children undoubtedly likewise, I thought it a wonder that the Hales got any of the nuts.

In the case of most of our fine parent nut trees they are either situated in out-of-the-way places where it is a task to get to them, or else they are situated on the side of a traveled road where the passersby are pretty likely to get a great many of the nuts.

Take the case of the Fairbanks hickory in Alamosa, Iowa, It stands on the side of the road on top of a hill outside of the limit of the houses of the town. I do not see how it can help being that a great proportion of the nuts are picked up by passersby. When we have grafted trees planted where they can be protected and the crop can be watched we can get reliable data for our records; but I am afraid that except in a few instances, we cannot get such data for the parent trees.

Mr. Rush: California is the leader in the Persian walnut industry and I think it would be better for us to fall in line and adopt some of their varieties. I find that they are perfectly hardy here, just as hardy as are varieties that have been grown here for a hundred years.

Mr. L. N. Spencer: Right back of the postoffice are some English walnut trees. They are growing very nicely. They have withstood all kinds of weather. I have not noticed any dead limbs on the trees nor any other indications that the climate here is not adapted to the growing of these trees. We would be glad indeed to show you the trees if you would come to the postoffice. They are not on ground belonging to the United States government but on private ground.

I have been very much interested in your discussion. I came here because I expect to set out some more nut trees.

THE PRESIDENT: There are two items of business left for the convention. One is, receiving the report of the nominating committee; the other is, to determine upon a place for holding our next convention. If there is nothing further to be brought before the session by the members these two items will now receive our consideration. The first of the two would be the report of the nominating committee.

MR. OLCOTT: Your nominating committee respectfully reports the following nominations for officers of the Northern Nut Growers' Association for the coming fiscal year:

President—James S. McGlennon, Rochester, N. Y.
Vice-President—J. F. Jones, Lancaster, Pa.
Secretary—William C. Deming, Wilton, Conn.
Treasurer—Willard G. Bixby, Baldwin, N. Y.

Your committee begs leave to suggest that as the details of an aggressive campaign to increase the membership of the Association entail a considerable amount of correspondence and other work, the Secretary should be relieved to as great an extent as is practicable, and to that end particular attention should be paid to the selcetion of a Membership Committee. It is the belief that this is one of the most important committees of the Association and that systematic endeavor upon definite lines should be made to extend the membership; that this work should begin at once and be maintained earnestly throughout the coming fiscal year.

RALPH T. OLCOTT,
J. F. JONES,
JOHN RICK,
C. S. RIDGWAY,
Committee.

MR. LITTLEPAGE: I move the adoption of the report.

(Motion seconded and carried, and the officers therein referred to were declared elected.)

THE PRESIDENT: The second item is to determine the place of the next meeting. A motion would be in order covering that.

THE TREASURER: Inasmuch as we have in Rochester, New York, an orchard of filberts which is beginning to bear real crops—and that is something none of us has ever seen—if Rochester would like to have us come I move that we go there next year.

Mr. Olcott: Rochester would like to have you come.

Mr. McGlennon: I was going to ask that the convention be brought to Rochester next year. I would certainly like to see it there. I second Mr. Bixby's motion.

(Motion carried unanimously.)

It was moved and seconded that the next annual convention be held on September 7 and 8, 1922.

(Motion carried unanimously.)

Mr. Littlepage moved (seconded by Mr. McGlennon) that Mr. Harrison H. Dodge. Superintendent of Mount Vernon. be elected an honorary member of this association.

(Motion carried unanimously.)

The President: I desire to say that in this package I have four seedlings from the walnuts that were supplied from Mount Vernon. A few of the walnuts left from last year's supply were placed in the hands of a nurseryman or florist in Saginaw too late for planting—the ground had become frozen—and those few nuts be placed in pots in his greenhouse. They grew very vigorously and I have four of those in little earthen pots for planting this afternoon.

Mr. McGlennon: I make a motion that a vote of thanks be extended to Dr. Morris and the others whose papers were read by our secretary yesterday morning and that they be notified accordingly.

Senator Penney: I second the motion.

(Motion carried unanimously.)

The Secretary: I feel that we should express our appreciation of the efforts of the local committee and the management of this hotel. I therefore move a vote of thanks to Mr. Rush and Mr. Jones for their work in the management of this convention, and to the management of the hotel for the kindness they have shown us.

Mr. Littlepage: I second the motion.

(Motion carried unanimously.)

The President: We will now adjourn to gather here at two o'clock in order to go on a sight-seeing trip or excursion around the city and county and then to Long's Park at 4:30 o'clock for the tree planting.

PROCEEDINGS OF THE TREE PLANTING CEREMONIES AT LONG'S PARK, LANCASTER COUNTY, PA.

1:30 p. m., October 7, 1921

PRESIDENT LINTON: The four young walnut trees that we have before us are grown from walnuts from trees at Mount Vernon near the tomb of General Washington. The trees there were planted unquestionably during the lifetime of Washington, and have grown to be fine specimens of their particular species. Last fall the ladies of the Mount Vernon Association gave to the Northern Nut Growers Association all of the walnuts upon the trees at Washington's home. They divided those nuts into two lots and the best ones were presented to the association for the purpose of public planting. Under no circumstances were the nuts to be commercialized or sold for gain but were to be planted by the school children of the land, if it could be satisfactorily arranged in the short time that we had before the end of the planting season. We found it impossible to distribute these walnuts throughout the country, although the demand kept coming for them from many states, so they were distributed first to the district schools outside of the city of Saginaw in the County of Saginaw and there planted by the school children with appropriate ceremonies. Then our city schools asked for them and in every school yard in the city of Saginaw are some Washington walnuts growing today. Following this distribution to the schools we had still several bushels of the nuts, and one bushel was presented to what is known as Merlin Grotto, a branch or division of the Masonic Order. As General Washington was a member of that organization it seemed fitting that that society should have some of the nuts. So in the beautiful grounds outside of our city that are owned and controlled by Merlin Grotto there were also planted some of these Mount Vernon walnuts. Then we still had about two dozen of them left, and they were planted in what is known as the Ezra Rush Park in Saginaw, our largest city park. They are there in rows to be transplanted this coming spring and will be again distributed to the schools, or to public places desiring them, as long as they may last. The four specimens that you have before you, gentlemen, are from nuts from trees planted during President Washington's time at his home. We trust that they may live in this beautiful park in Lancaster and that they may go down in history showing the source from whence they came.

PROF. HERBERT H. BECK: Gentlemen: It is a very great privilege to represent Franklin and Marshall College in extending a word of greeting as well as comradeship to the Northern Nut Growers' Association. I use the word comradeship advisedly because we have interests that are indubitably kindred. Our two institutions are both concerned with the cultivation of something that will contribute to the strength and happiness of each as Americans—your institution in the cultivation of useful trees—our institution in the cultivation of useful men. It may well be said, show me a man who loves and cultivates trees and I will show you a man who loves his fellow men and puts that love into practice. That cannot be said, unfortunately, of every man who graduates from college. It is to be doubted whether the name of John Harvey, considered abroad as worthy of a higher place in the annals of American horticulture, is greater than the name of Johnny Appleseed, the man who took apple trees out into the frontier of the open road. My only regret is that I have never been in a position to do so. I can say, though, with Dr. Holmes, for whose opinion on such things I have a most profound admiration, that I have an intense, passionate fondness for all trees in general and for certain trees in particular. When I go out among the trees I have a kinship there. I am never lonely when I am in a forest and I cannot say that when I am alone in a big city. I like to look upon an old tree as a patriarch with not only an honored past but an interesting story locked up under its bark. As I go to such a place as Valley Forge, I like to lay my hand on the rough bark of an old tree and say, "Oh, but that you might tell your tale; you are the only thing left which looked upon the scene in which a few were crucified that many might live." Such are the thoughts that come to me when I stand by an old tree. I like to let my mind run back to the beginnings of trees, to the pre-historic times when this bed rock was laid down, when all this region was an inlet or bay from the Atlantic Ocean and the upland was treeless as our rock record shows. Then there were the beginnings of low fern-like growth and clotted mass which gradually increased in size until they assumed the enormous proportions which made the coal beds possible. And then I like to follow the growth of trees on to the broad leaf. We have the beginnings of the broad leaf, the sassafras, the poplars, the maples, and the oaks, and then, as the crowning feature of the evolutionary process, the nut tree. I like to let my mind run ahead a bit, particularly at such a time as this when we are setting out new trees. What sort of people will these trees live to see? Will there be a decadence of the taste and fondness for trees, which we hope is growing? Will these trees live to see a race of people who take no interest in such things except a commercial one, who have no thought for the beauty of the trees nor for the rights of posterity? Will these trees perchance live to see an upheaval of the happy affairs which now exist in this country? In one hundred and fifty years many things can happen. There is much in the existing turmoil of war conditions that suggests possible disaster within the next couple of centuries, and possibly that the fair constitution of Franklin and Washington may be submerged in a chaos of something that means nothing. The remote possibility of the invasion of a conquering race to destroy all these things—but banish the thought. God grant, that these young trees may grow up to furnish shade and fruit in proper season to thousands of happy people, that they may always be useful and that they may not live to see the time when disaster may come to this fair land.

In closing, gentlemen, I wish to compliment you on what seems to me to be the excellence of your personnel and organization. I am strongly impressed with the fact that your organization has a prime scientific value as well, as a profound practical significance. I congratulate you on these excellent qualities and traits of your association, wish you all success and thank you for the privilege you have given me.

Dean R. L. Watts: This seems to me almost like a sacred moment. As I stand here in this circle, the ground upheaved there and that hole in the ground, I think of something else that we stand around sometimes. In a very large degree, especially in considering the remarks of Professor Beck, it is a sacred occasion. What could be more sacred? What could we regard with greater solemnity than the planting of trees that will help all mankind.

Particularly in connection with the planting of young trees I think of my own boyhood experiences. Whenever I think of the boys and girls in the woods picking up nuts it is pretty hard for me to think of those boys and girls going wrong. One of the biggest things we have to look at in this country is the question of maintaining high standards of manhood and womanhood. In that the safety of our country rests.

I wonder why I was asked to speak at this meeting of the Nut Growers' Association. I do not know whether my friend Professor Fagan suggested that I be placed on the program or not. Perhaps he had heard about what happens in my own home. I have never gotten away from liking a little manual labor. I do not want too much of it but I do like a little of it, making garden and taking care of the furnace. Mrs. Watts sometimes blames me for wanting to take care of the furnace in the cellar in the winter time from the fact that I have always a bag of nuts down there. When I go down she hears me cracking nuts. From my earliest boyhood days I have been tremendously interested in the whole nut proposition. What I have to say here today I have put in written form.

A NATIONAL PROGRAM FOR THE PROMOTION OF NUT CULTURE

Dean Watts

I am highly honored in being invited to present a paper before the members of the Northern Nut Growers' Association.

For twelve years your association has stood for all that is good in American nut culture. You have considered the different classes and varieties that are worthy a place in American horticulture. You have discussed how the various classes may best be propagated and cultivated and have disseminated whatever information is available concerning the control of fungous and insect enemies of nut bearing trees. Some of your members have conducted investigations of great value to the industry and others have made a special study of the food value of nuts as compared with other standard foods. The eleven annual reports of the association are indicative of the broad field of study and service which has been covered by a zealous and enthusiastic body of nut specialists.

Surely there is no doubt in the mind of any member of this association concerning the importance of nut culture in the United States. From the standpoint of food alone, we are more than justified in wageing a vigorous campaign for the planting of millions of trees. Who can mention any article of food that is more nutritious, more wholesome, more delicious than any and all of our native nuts as well as many imported species? And what other class of trees even approaches the nut as a dual purpose tree? In fact, as is well known, nut trees have four distinct values; namely, to furnish food, shade, timber and ornamentatlon to the landscape.

In view of the important place which nut trees should have in American horticulture, can we not manage in some way to plan and carry out a comprehensive national program for the promotion of this proposition? Surely there are thousands of people and hundreds of organizations and institutions of various kinds which would consider it a privilege to have a real part in such a worthy cause.

For one who has been a member of this association for only a few hours, it may seem a little presumptuous to even suggest a national program for the promotion of nut culture, to say nothing of what should constitute such a program. But, running the risk of someone hurling a chestnut burr at me, I will venture a few suggestions, though they may be as old as the sweetest of American nuts.

RESEARCH

The great fundamental need of all American agriculture is research. This statement applies to nut culture more than to any other branch of horticulture because it has received less attention from well trained investigators. Much credit is due the members of this association for their patient and painstaking studies. But instead of having a mere handful of men devoting their time to nut investigations, there ought to be several men in each state engaged in working on the numerous problems of vital importance to the nut industry.

Prof. Reed of the United States Department of Agriculture should have a staff of several specialists, in order that he might make greater progress in working out projects of national importance. The State Agricultural Experiment Stations have shown very little interest in this matter. Funds should be made available in each state to undertake nut investigations that promise results of economic value. However, if the United States Department of Agriculture and the State Experiment Stations are to make real expansion in nut investigations, there must be demands and outside pressure from prominent people; as for example, from the members of this association. More and more the farmers of the country are petitioning their Experiment Stations to make certain studies and it is unlikely that these institutions will do very much for the nut industry unless the rural population indicate that they want this line of work included in the experimental program.

Mr. President, cannot this association block out at least a tentative nut research program for the whole United States? What are the problems that should have first consideration? What do you think the Pennsylvania Agricultural Experiment Station should do for nut culture in this state? As Director of the Pennsylvania Station, I would like to have this question answered by the nut enthusiasts of the state. Dr. Fletcher and Prof. Fagan stand ready to carry out your wishes and I pledge them my heartiest co-operation. Many of you know that the Pennsylvania Station is now working under a great handicap financially, but this situation may change within a few years.

Teaching

I have been wondering whether all of the Agricultural Colleges give instruction in nut culture. If they do, just how much consideration is given to this important matter. It is one thing to give a careful, thorough, systematic course, covering a whole term or semester but quite another proposition to give a few disconnected lectures. If a committee of this association could look into the matter and formulate a suggestive program for the Colleges, it would stimulate greater interest in the subject in all of the Agricultural Colleges.

In this connection let us not lose sight of the fact that the number of College boys on our farms is increasing very rapidly. Not long ago I attended a Farm Bureau meeting in Washington County, Pennsylvania, at which there were twenty-five to thirty young men who had taken Agricultural courses at The Pennsylvania State College. We can readily see what an opportunity it is to teach these College boys the benefits of planting nut bearing trees on their home places.

Again, we should manage in some way or other to permeate our town and rural schools with the nut planting spirit. Thousands and thousands of shade trees are planted where nut trees would be much more desirable. Every country school ground might well serve as a demonstration center of the best nut producing trees for that community. If such a scheme were carried out intelligently, our farmsteads would soon abound with nut trees. Let us not lose sight of the value of the demonstration idea in any nut propaganda work that may be undertaken.

Extension Service

The United States has the best and most wonderful system of Agricultural Extension of any country in the world. Are we using this system to extend the planting of nut bearing trees Do we not know of classes and varieties which may be planted under suitable conditions that will be certain to give satisfactory results? If so, why not get this information in definite form before our County Agents and Farm Bureaus and let them pass it along to the soil tillers. Perhaps the time is not far off when the Colleges might appoint Nut Extension Specialists who would work through the County Agents and public schools and handle this matter in a thorough, effective, systematic manner. Surely we have the machinery for the dissemination of whatever knowledge is available relating to the selection, planting and care of nut bearing trees.

STATE DEPARTMENTS

All of the numerous State Departments of Agriculture, Forestry, Game Conservation, etc., in this and every other state should be vitally interested in the nut proposition. Perhaps some of the officials in these State Departments don't realize the possibilities of nut planting? Is there any way of educating them? For example, our Game Commissioners are worrying over the disappearance of the chestnut as a source of food for squirrels. Do they realize that the bush chinquapin might be substituted with success, in some sections at least? And why not get game and squirrel lovers and tree planters in general to enthuse about the planting of black walnuts with a liberal sprinkling of butternuts? The result would be food for the squirrels, for the kiddies and some for the old folks, besides useful timber trees and also beautiful roadsides and farmsteads.

THE PRESS

We ought to manage in some way to get more material relating to nuts published in country papers and magazines, especially in the farm papers. Millions of copies of the agricultural papers reach our farm homes every week. They are read largely by the boys and girls who are always very much interested in nuts.

STATE LAWS

It do not know how much can be accomplished by passing laws that will encourage the planting of nut bearing trees, especially along the roadside. All of us will watch with much interest the Penney Law of Michigan. A very careful study should be made of this phase of the problem and then urge the passage of such laws in each state as will be most favorable to the development of the whole proposition.

ASSOCIATIONS

For real aggressive work we must rely very largely upon numerous associations, national, state, county and local. This association should take the lead and many others can render tremendous assistance in carrying out a national program. Enthusiasts in every community should see to it that the subject is properly represented at the local meetings of horticultural associations and other organizations which discuss rural problems.

In closing this paper may I again urge the importance of a constructive research program, if nut culture is to make any considerable progress in the United States.

APPENDIX

Members and others present: E. M. Ives, Meriden, Conn.; Jacob E. Brown, Elmer, N. J.; Jacob A. Rife, S. J. Rife, J. S. Rittenhouse, Loraine, Pa.; Christian LeFevre, W. Lampeter, Pa.; John Rick, Mr. and Mrs. Samuel L. Smedley, Prof. H. H. Beck, J. E. Fortney, J. F. Jones, Harvey A. Penney, James M. Balthaser, James S. McGlennon, Ralph T. Olcott, John Watson, J. G. Rush, T. P. Littlepage, Mr. and Mrs. C. S. Ridgway, Prof. F. N. Fagan, A. C. Pomeroy, C. M. Leiter, Ralph W. Leiter,, Elam G. Hess, W. N. Roper, Mr. and Mrs. W. G. Bixby, Mrs. N. R. Haines, Wilmer Wescoat, Patrick O'Connor, Postmaster Spencer, Dr. W. C. Deming, W. S. Linton, J. S. Ritchie, Dr. C. A. Cannaday, Dean R. L. Watts, Mr. and Mrs. W. C. Rhodes, Ammon P. Fritz, Mr .and Mrs. Blockhauser, D. F. Clark, Rev. and Mrs. Geo. A. Stauffer, Harry Stuart, Oliver S. Shaefer.

Exhibits: Black walnuts, Ohio, Stabler from original tree at Brookville, Md.; Thomas, considered the best of the larger sorts, and perhaps the best cracker among these, tree a very rapid grower and a good and reliable bearer; Persian walnut, Alpine, from Benj. Mylin, Willow St. Pa. grafted tree; Juglans sieboldiana or sieboldi, Japan walnut, rapid grower and beautiful tree; Juglans cordiformis, Japan walnut, tree similar to the sieboldiana but a better nut, grafted trees bearing very early; Indiana pecan from original tree Wabash River bottoms, Oaktown, Ind.; Niblack pecan from original pecan in Indiana; Weiker hickory seedlings, 1, 2, 3, 4, 5, from seedlings 60 years old from the parent tree 200 years old at Lampeter, Lancaster Co., Pa., showing marked variation from the type of the parent tree, which is believed to be a cross between the shagbark and the shellbark; Kirtland shagbark from original tree at Yalesville, Ct.; Laney shagbark-bitternut hybrid from original tree in Rochester, N. Y. city park; Fairbanks shagbark-bitternut hybrid from topworked tree, original tree near Cedar Rapids, Iowa; Leaves, burrs and nuts of Morris hybrid chestnut No. 1, American sweet chestnut pollen on chinkapin. High quality, good size, prolific. Tree has not blighted to date after twelve years exposure to blighting chestnuts and chinkapins. Leaves, burrs and nuts of Morris hybrid chestnut No. 2, American sweet chestnut pollen on chinkapin. High quality, bright color, good size, not so prolific as No. 1 and No. 3 as it leaves some of the racemes of burrs unfilled. The tree has not blighted to date after twelve years of exposure to blighting chestnuts and chinkapins. Leaves, burrs and nuts of Morris hybrid chestnut No. 3, American sweet chestnut pollen on chinkapin. Many Japanese and Korean chestnuts were blossoming in the vicinity and this may be an accidental pollination from them instead of from pollen of the American chestnut. Quality not so good as that of No. 1 and No. 2. Nut dull in color instead of bright. Tree prolific, has shown blight but once during twelve years of exposure among blighting chestnuts and chinkapins. Blight took place at a place where the tree was injured by a falling limb from a dying chestnut tree. The blighted spot was cut out and did not reappear. Filberts, Emperor, Du Chilly, Montebello, Noce Lunghe, Italian Red, Des Anglais, Red Aveline, Cornucopia, Imperial Daviana; Nelubium luteum, American lotus, also called water chinkapin, Yonkopin, etc., an aquatic plant; Nelubium speciosum, Egyptian lotus, much cultivated for its large, beautiful flowers.

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